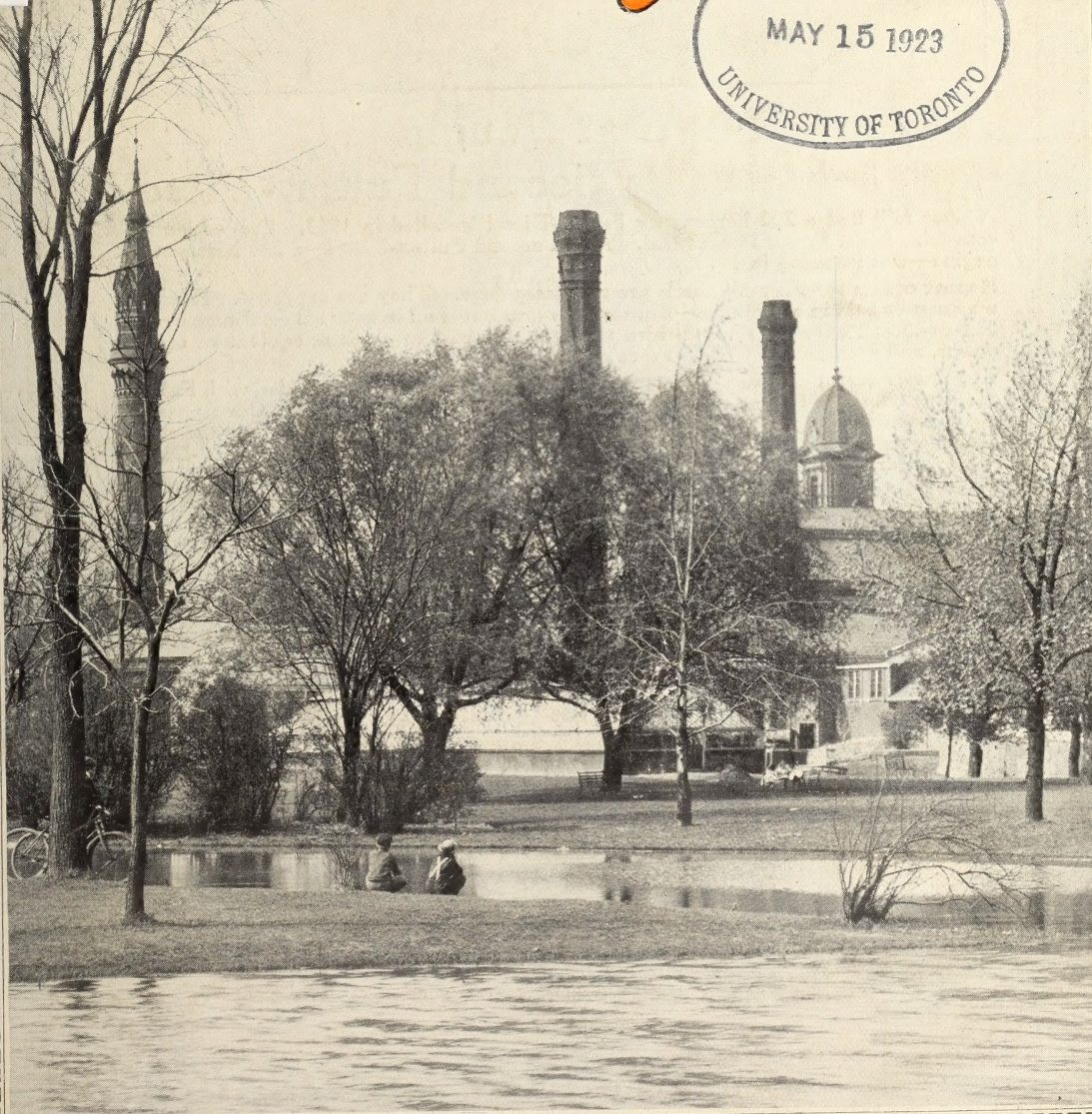
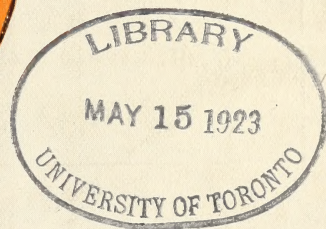


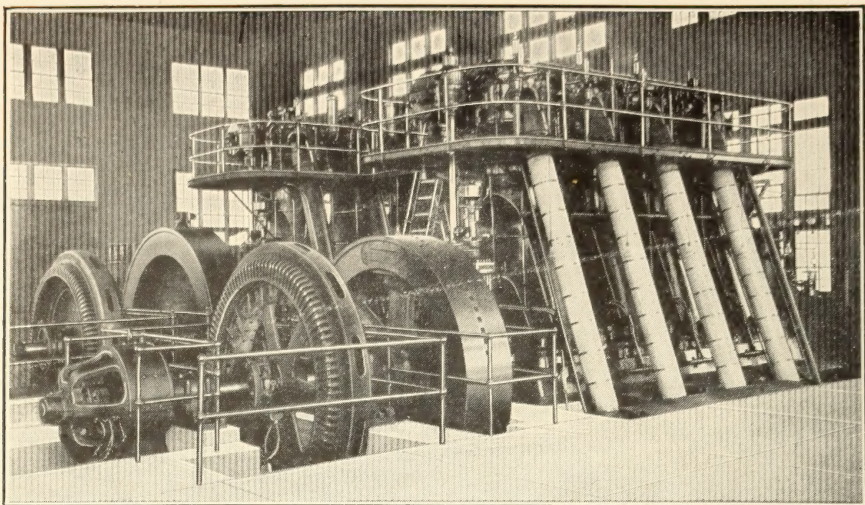
PolSci
78
May, 1923

Vol. XXVIII No. 5
50 Cents \$4 a Year

The American City



View in Water Works Park, Detroit, Showing Pumping Station



A Flour Mill That Bought Its Second Fulton-Diesel

A flour mill had a 200 horsepower Fulton-Diesel installed in 1913. Production increased. More Power was needed. And a second Fulton-Diesel—a 285 horsepower engine—was installed in 1919.

Repeat orders for Fulton-Diesels are not exceptions. They are expected. Reasons why can be told in a sentence—Burning low-grade fuel oil in internal combustion, the Fulton-Diesel operates on one-third the fuel required to produce equivalent steam power, and attendants are reduced to one engineer.

The simple design and automatic operation of the Fulton-Diesel, coupled with Fulton cooperation, make it easy for the plant engineer to become an expert. Our supervising engineers make regular visits to each Fulton installation to advise upon the most efficient methods of Diesel practice. Plant engineers interested in Fulton-Diesel operation are cordially invited to St. Louis to visit our shops.

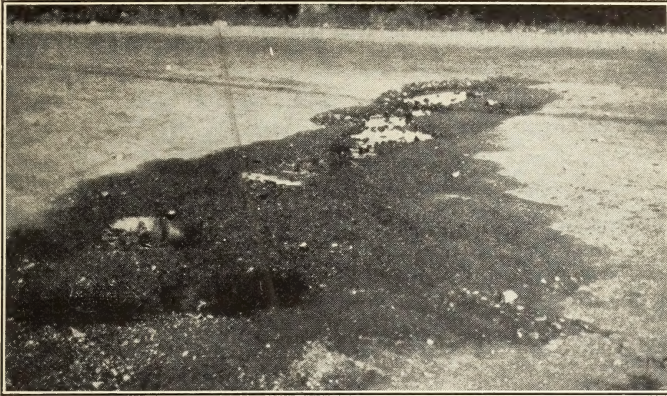
On request from executives and engineers our latest illustrated book describing the Fulton Diesel will be mailed free and postpaid. Our staff of engineers is ready at all times to advise on any power problem—anywhere—without charge or obligation.

FULTON IRON WORKS COMPANY, ST. LOUIS, U. S. A.

Successful engine builders for 70 years.

BRANCH OFFICES: New York—82 Wall St. Dallas, Texas—Praetorian Bldg. New Orleans, La.—Hibernia Bank Bldg. Havana, Cuba—401-402-403 Banco Nacional.

FULTON DIESEL



Street injured by leaking water mains

The penalty for installing inferior pipe for water mains will always be heavy. Aside from the loss of water and the increased cost of pumping, due to leakage, officials must consider the probability of torn-up streets and the danger of property damage.

Bell and spigot cast iron pipe properly installed is leak-proof, which is one reason why it has been the standard in water works installations for decades.

*Write for a copy of the
A. W. W. A. Specifications*

United States Cast Iron Pipe and Foundry Co.

GENERAL OFFICE: BURLINGTON, NEW JERSEY

SALES OFFICES:

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New York—71 Broadway
Pittsburgh—Henry W. Oliver Bldg.
Buffalo—957 E. Ferry St.
Chicago—122 South Michigan Boulevard
Kansas City, Mo.—Interstate Bldg.

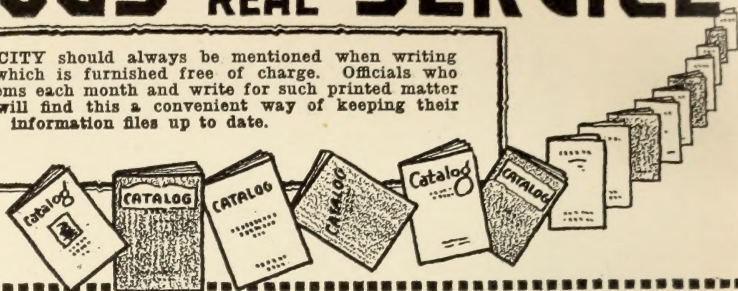
Dallas, Texas—Magnolia Building

Cincinnati—Dixie Terminal Building
Cleveland, Ohio—1150 E. 25th St., N. E.
St. Louis—Security Building
Birmingham, Ala.—American Trust Bldg.
San Francisco—Monadnock Building
Minneapolis—Plymouth Building

For quotations or estimates, apply to nearest sales office

CATALOGS OF REAL SERVICE

THE AMERICAN CITY should always be mentioned when writing for this material, which is furnished free of charge. Officials who check over these items each month and write for such printed matter as interests them will find this a convenient way of keeping their information files up to date.



PORTABLE ASPHALT PLANTS FOR MUNICIPAL WORK

The latest descriptive matter issued by the Austin Machinery Corp., 3500 Dorr St., Toledo, Ohio, describes in detail the new Austin portable asphalt plant, which has a capacity of 1,800 square yards of 2-inch asphalt top per 10 hours.

SUPERIOR WATER PIPE

The U. S. Cast Iron Pipe & Foundry Co., Burlington, N. J., will be pleased to furnish costs of its cast iron pipe and also a copy of the A. W. W. A. cast iron pipe specifications free on request.

SAFE PLAYGROUND APPARATUS

The latest playground apparatus catalog of the Everwear Mfg. Co., Springfield, Ohio, describes the details of this apparatus and pictures the many forms of its playground equipment, which is built with a real margin of safety.

THE USES OF VITRIFIED SEWER PIPE

In a well-illustrated 38-page booklet, "Deliverance from Plague," the Blackmer & Post Pipe Co., Wainwright Building, St. Louis, Mo., describes the uses of its high-grade vitrified pipe for sanitary sewers, water-supply lines and culverts, as well as its other vitrified products.

EVERYTHING FOR THE ROAD MAKER

This is the title of the handsome new catalog recently issued by the Good Roads Machinery Co., Kennett Square, Pa., which describes this company's complete line of machinery to handle all road construction and maintenance needs.

A SELF-DUMPING TRUCK BODY

Bulletin 77-AC, issued by the Lee Trailer & Body Co., 2643 S. La Salle St., Chicago, Ill., gives worthwhile data regarding the new economical self-dumping body which this company makes for garbage, rubbish and refuse collection.

TRAFFIC CONTROL WITHOUT LEGAL LIABILITY

The Safety Traffic Light Co., 425 E. Water St., Milwaukee, Wis., will send its catalog and prices covering the Safety Traffic Light, which is claimed to be the one safe light—the light with the disappearing dome.

ROTARY PUMPS FOR FIRE SERVICE

The reasons why more than 1,000 Northern rotary pumps have been sold for installation on motor-driven fire apparatus, is told in detail in the latest literature of the Northern Fire Apparatus Company, Minneapolis, Minn.

NURSERY STOCK FOR CITIES

The latest catalog of I. E. Ilgenfritz' Sons Co., The Monroe Nursery, Monroe, Mich., describes its large stock of shrubs, trees, plants and vines, which are available for municipal and private planting.

CUT MORE GRASS AT LESS COST

The Ideal Power Lawn Mower Co., 400 Kalamazoo St., Lansing, Mich., will be pleased to send literature to municipal and park officials showing why the Ideal triplex power mower has in many cases replaced all other types of equipment on golf courses, estates and parks.

MOTOR SPRINKLERS FOR SMALL COMMUNITIES

The Heil Company, 1242-60 26th Ave., Milwaukee, Wis., has recently brought out the Heil-Ford sprinkler, capable of covering three city blocks and holding 500 gallons. This sprinkler is described in the latest literature of the Heil Co.

HOW TO CURE CONCRETE IN ROAD WORK

A manual of instructions on concrete highway construction under the title "How to Cure Concrete" and covering all phases of construction work, has been issued by the Dow Chemical Co., Midland, Mich., for free distribution among highway engineers, municipal officials and contractors.

A NEW JOINT-FILLING POT

In catalog B issued by the Tarrant Mfg. Co., Saratoga Springs, N. Y., municipal officials and contractors will find described a number of valuable tools for asphalt street work, particularly the new "Tarco" joint filler, which fills crooked or uneven cracks as well as straight joints in concrete and other pavements.

WELL-BUILT DUMPING WAGONS

The latest 32-page catalog of the Watson Products Corp., Canastota, N. Y., describes Watson dumping wagons, which are claimed to be first in the field and last in the repair shop.

A STONE SPREADER THAT SAVES ITS COST

The value of the Burch stone spreader in saving material and money on road jobs is told in literature which may be secured from Department A5, the Burch Plow Works, Crestline, Ohio.

A SMALL, COMPLETE, RAPID ASPHALT MIXER

The Barber Asphalt Co., Land Title Bldg., Philadelphia, Pa., in a new circular describes its patented process for quickly producing a hot asphalt mix of proper temperature and consistency with the use of the new Iroquois rapid mixer.

LAMPS AND LANTERNS FOR TRAFFIC LIGHTS

Circular TL-3, issued by the Dressel, Main Co., Inc., Grand Central Terminal, New York City, describes Dressel semaphore lamps, traffic lanterns, etc., for traffic signal lights.

A NEW TYPE OF POWER LAWN-MOWER

A distinctly new type of power lawn-mower which is claimed to have many advantages over the types on the market to-day, is described in detail in literature which may be secured from the Gilson Mfg. Co., 250 Clark St., Port Washington, Wis.

CONCRETE LIGHTING STANDARDS

Lighting standards made of concrete which measure up to the highest standards of appearance and which may also be used as combined trolley and lighting poles, are described in literature of the Massey Concrete Products Corp., Peoples Gas Bldg., Chicago, Ill.

RESULTS ON ROAD JOBS

This is an interesting booklet containing photographs and diagrams of 24 typical construction jobs, illustrating city and county paving work, which will be sent free to any interested city or contractors by Barber-Greene Co., Aurora, Ill.

FACTS CONCERNING FROST-PROOF METERS

Circular No. 106, issued by the Thomson Meter Co., 100-110 Bridge St., Brooklyn, N. Y., describes the method by which the well-known Lambert meter is made frost-proof.

CLEANER STREETS

The Elgin Sales Corp., 501 Fifth Ave., New York City, will be pleased to send its literature describing the Elgin auto sweeper and the Elgin motor pick-up sweeper, which effectively clean streets without creating a dust nuisance.

THE AMERICAN CITY

MATHIESON Chemicals

Liquid Chlorine for Water Purification

AN individual weight record of each cylinder is no longer necessary if you use Mathieson liquid chlorine.

Our cylinders are now loaded with an even net weight of liquid chlorine—105 pounds in the small size, 150 pounds in the large size.

Together with the Mathieson Chlorine Valve and the Mathieson plan of cleaning, drying and inspecting all cylinder equipment before refilling, this new feature rounds out a service you cannot afford to overlook.

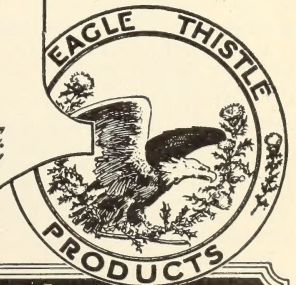
Specify Mathieson gray cylinders — the cylinders with standard weights of liquid chlorine.

*Let us help you with your
water purification problems*

The **MATHIESON ALKALI WORKS Inc.**
25 WEST 43rd STREET NEW YORK CITY

PHILADELPHIA
PROVIDENCE

CHICAGO
CHARLOTTE



Deal Direct with the Manufacturer

Catalogs of Real Service

You can secure any or all free of charge if you mention The American City

SAFER PLAYGROUND SWINGS

Catalog M-6 describing Medart playground systems tells why the swings made by the Fred Medart Mfg. Co., Potomac and DeKalb Sts., St. Louis, Mo., are safer and wear longer.

HYDRANTS THAT ARE READY TO SERVE

Complete descriptions of Darling fire hydrants, which are always ready to serve the fireman at a moment's notice, are given in the latest catalog of the Darling Valve & Mfg. Co., Williamsport, Pa.

WATER-METERS

American and Niagara water-meters, made in ten pipe sizes and four styles of outside casings, with round reading or straight reading registers, are described in the catalog of the Buffalo Meter Co., 2902 Main St., Buffalo, N. Y.

CITIES WITH CLEAN WATER-MAINS

The National Water Main Cleaning Co., Hudson Terminal Bldg., New York City, has recently issued an interesting booklet, "Proof" of the efficiency, economy and necessity of cleaning water-mains, which gives the names of cities where this company has cleaned pipes and also lists the many repeat orders which have been received.

AIR-LIFT PUMPS

The use of the Sullivan air lift and "back blowing," which prevents deep wells from becoming silted up with sand or mud, is described in Bulletin 371-G, which may be secured from the Sullivan Machinery Co., 105 S. Michigan Ave., Chicago, Ill.

SANITARY DRINKING FOUNTAINS

The question, "How sanitary is it?" which should first be considered in selecting a drinking fountain, is answered in the complete catalog of the Halsey W. Taylor Co., Warren, Ohio.

JAIL CELLS

A complete catalog of all types of jail cells will be mailed to any interested municipal officials by the E. T. Barnum Iron Works, Detroit, Mich.

WATER-METERS FOR EVERY CLASS OF SERVICE

The Pittsburgh Meter Co., Pittsburgh, Pa., will send to any interested water-works or other municipal officials its latest literature describing Pittsburgh water-meters for every class of service.

A VACUUM TYPE WATER CHLORINATOR

Technical Publication No. 38, issued by Wallace & Tiernan, Inc., Newark, N. J., describes this company's new type of vacuum chlorinator, which has particular advantages for use in suction lines.

THOROUGHLY RELIABLE DIESEL ENGINES

The McIntosh & Seymour Corp., Auburn, N. Y., will furnish on request full details covering its industrial Diesel engines, which are claimed to be most economical, thoroughly reliable, and the best for all lighting, power, water-works and pumping plants.

GUARANTEED WATER-SUPPLIES

The Layne & Bowler Co., Memphis, Tenn., will send literature telling just why it offers to install water-supplies on a basis of guaranteed results, "No water, no pay."

WATER-SUPPLY FOR SWIMMING POOLS

A special bulletin, No. AC-500, has recently been issued by the Graver Corp., 620 Todd Ave., East Chicago, Ind., describing in detail the Graver recirculating and filtering system for municipal swimming pools.

CENTRIFUGAL PUMPS FOR MUNICIPAL SERVICES

In its 60-page publication No. 1632-F, the Allis-Chalmers Mfg. Co., Milwaukee, Wis., gives a great deal of information regarding the economy, durability and freedom from repairs experienced with Allis-Chalmers centrifugal pumping units, both large and small.

ODORLESS SEWAGE DISPOSAL

Booklets and complete data on the direct oxidation method of sewage disposal, which is claimed to be odorless and to produce an inoffensive sludge of substantial value, may be secured from the Direct Oxidation Disposal Corp., Pennsylvania Bldg., Philadelphia, Pa.

SCHOOLHOUSE STEPS MADE SLIP-PROOF

City officials should consider the safety of school children in making all stairways and steps within school-houses slip-proof. The Norton Co., Worcester, Mass., will send to any interested officials on request its literature describing Alundum safety tile which satisfactorily solves the problem.

TRANSPORTATION FOR ROAD CONSTRUCTION

A well-illustrated booklet, "Money-Saving Transportation for Road Construction and Maintenance," containing quantity tables for concrete road construction and hauling data, may be secured by writing to the General Motors Truck Co., Pontiac, Mich.

HOW THE POLICE USE MOTOR-CYCLES

"Maintaining Law and Order" is the title of the new special police booklet issued by the Hendee Mfg. Co., Springfield, Mass., telling of the use of this motor-cycle by progressive police departments in American cities.

IRON FENCING

Catalog 22-C, issued by the Enterprise Iron Works, 1114 East 24th St., Indianapolis, Ind., describes the complete service of design, fabrication and erection of iron fencing which this company is able to offer for schools, parks, playgrounds, cemeteries, etc.

PAINT FOR MARKING STREETS

The Hoosier Paint Works, Fort Wayne, Ind., will on request send to city officials full information and prices of Hoosier street marking white, a long-wearing paint, for marking traffic zones, parking spaces and street crossings, where conditions require.

STEAM AND OIL-ENGINE-DRIVEN PUMPS

Bulletin 1632-F and 1637, issued by the Allis-Chalmers Co., Milwaukee, Wis., contains data on Allis-Chalmers steam, motor and oil-engine-driven crank and fly-wheel pumps, geared steam-turbine-driven centrifugal pumps, and centrifugal pumps with any of the other drives, and also screw pumps.

SHARP LAWN-MOWERS SAVE TIME

A lawn-mower sharpener which will sharpen all makes of power, horse or hand mowers in 20 to 30 minutes, saving considerable time and money annually, is described in detail in the catalog of the Fate-Roote-Heath Co., Plymouth, Ohio.

BETTER WATER-METERS

The Federal Meter Co., Brooklyn, N. Y., will be pleased to supply detailed information regarding the new Federal meter, designed to meet the demands of water-works superintendents for a better water-meter.

A FIRE HYDRANT OF SUPERIOR DESIGN

The newest improved model Iowa fire hydrant, made of first-class material and workmanship, is described in detail in the latest literature of the Iowa Valve Co., Oscaloosa, Iowa.

ELECTRIC TRAFFIC MARKERS

An electric mound traffic marker only 5½ inches high which has no water pockets and can be installed without excavation, is described in detail in the illustrated literature of the Mound Traffic Equipment Co., 184 West Spring St., Columbus, Ohio.

CENTRIFUGAL PUMPS

Lecourtney centrifugal pumps for all water-works needs, are described in detail in the literature of the Lecourtney Co., 8 Main St., Newark, N. J.

DEPENDABLE WATER-WORKS VALVES

Kennedy valves for use in every part of a water-works service, including aqueducts, pumping-stations and house services, are described in detail in the catalog of the Kennedy Valve Mfg. Co., Elmira, N. Y.

TURBINE-TYPE DEEP WELL PUMPS

In Bulletin No. 300, issued by the Aurora Pump & Manufacturing Co., 700 Loucke Street, Aurora, Ill., water-works engineers and officials will find complete information regarding this type of efficient deep well pump.

DEEP WELL PUMPS

A 100-page illustrated catalog for hydraulic engineers, water-works superintendents, interested in problems of water supply and deep well pumping, may be secured from the Keystone Driller Co., Beaver Falls, Pa.

Liquid Chlorine

*Look for the
RED Cylinder*

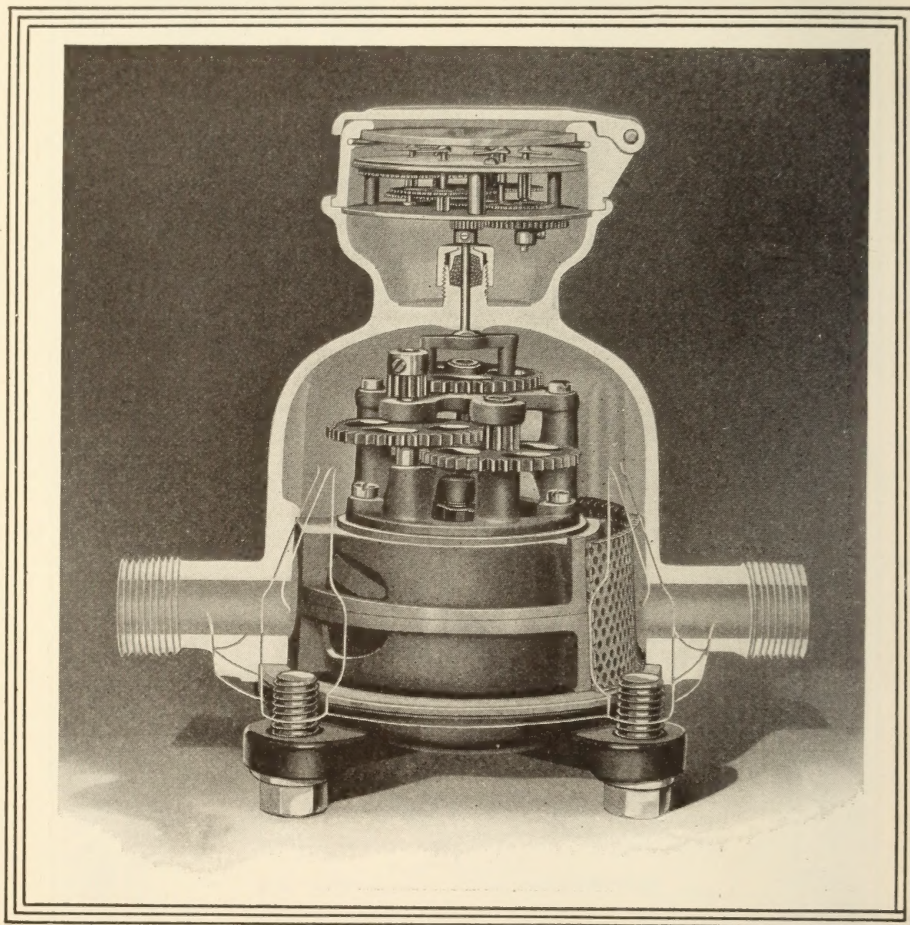
Electro Bleaching Gas Co.
PIONEER MANUFACTURERS of LIQUID CHLORINE
Plant NIAGARA FALLS, N.Y.
Main office 18 East 41st Street New York Chicago office 11 So. La Salle St

EBG

THE AMERICAN CITY

BADGER

DISC METERS



ARE ACCURATE AND SENSITIVE

METERS

"BADGER-MADE"

The increasing use of Badger meters by water works departments and companies in all parts of the United States can be explained only by the high grade of workmanship and materials entering into their manufacture, and because Badger Meters register accurately from the smallest flow to the maximum capacity of the line.

Badger Disc Meters have the largest capacities for meters of this type and maintain their value as accurate recorders of water used throughout their long lives. The improved Type A meters from $\frac{5}{8}$ -inch to 1- $\frac{1}{4}$ inches inclusive are equipped with breakable bottom plates which, in the event of freezing, give way with the expansion of the ice and relieve the working parts of abnormal pressure. There is no damage to the meter other than the breakage of the frost bottom which can be quickly and cheaply replaced.

Badger Turbine Meters are designed for industrial service where there is a heavier demand and will handle large volumes of water with very little loss of line pressure. They register accurately both large and comparatively low flows.

Badger Compound Meters are designed for services where the demand ranges from the smallest leaks up to the full capacity of the pipe. They combine the advantages of the Badger Disc and Turbine Meters.

Our free literature tells the full story

BADGER METER MFG. CO.

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KANSAS CITY, MO.

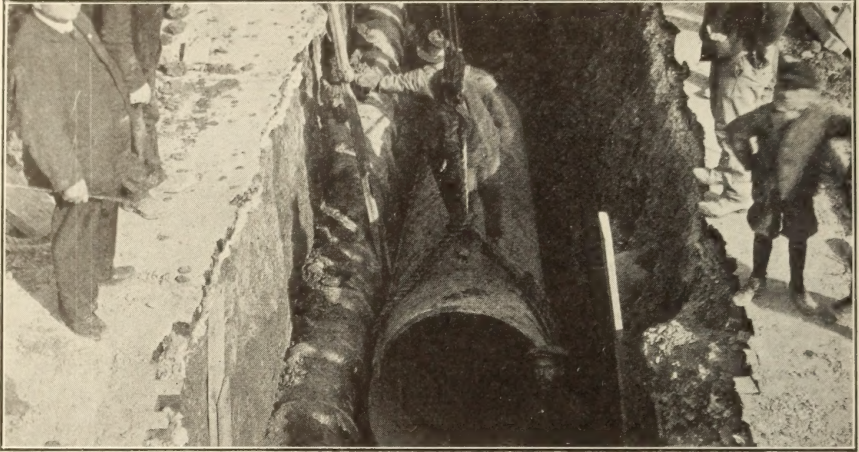
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BROOKLYN, N. Y.

1621-39 FIFTEENTH STREET
DENVER COLO.

ARE DURABLE AND EFFICIENT

LOCK BAR

The Pipe with the 100% Joint



IN DETROIT

During 1921, 49,000 feet of 48-inch Lock Bar Steel Pipe was laid in the streets of Detroit.

The Lock Bar Joint has held pressures of 1050 pounds per square inch—765 pounds above normal working pressure—and probably would have handled more had not the gauge and the inlet pads blown out. This pipe, which has shown such service records for conduits and supply mains, is now handling billions of gallons of water daily in the streets of American cities.

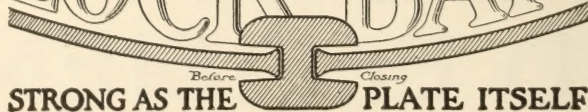
Steel pipe is cheaper than cast iron pipe in sizes of 24 inches and upwards, the difference in cost increasing with ascending pressure conditions. The 30-foot lengths involve fewer joints to be made in the trench and the fact that it is lighter and more readily transported than other metal pipe, makes the cost of installation considerably cheaper. The improved method of coating Lock Bar steel pipe assures long life and continuous service.

Our new "Handbook of Pipe" sent to municipal officials writing on city letterheads.

EAST JERSEY PIPE COMPANY

7 DEY ST., NEW YORK

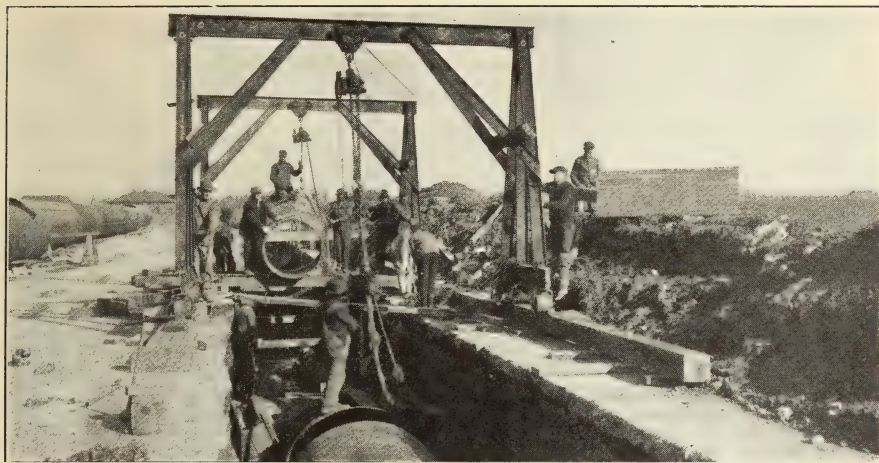
LOCK-BAR



STRONG AS THE PLATE ITSELF

STEEL PIPE

for CITY WATER MAINS



IN PHILADELPHIA

The pumping main of the Torresdale Line, Philadelphia, Pa., consists of 7,000 feet of Lock Bar Steel Pipe.

Steel pipe 60 inches in diameter laid from the former city of Allegheny, now a part of Pittsburgh, to the Montrose pumping station, a distance of about ten miles, was examined after it had been in the ground 23 years and was found to be in perfect condition. Tests which were made for corrosion and weight showed that the steel had lost practically nothing in this length of time.

In 1897, 33,000 feet of 50-inch steel pipe coated with rubber asphaltum was laid for the city of Minneapolis, Minn. This line has shown no leakage and has been entirely satisfactory even at the 1500-foot submerged crossing in the Mississippi River. The carrying capacity of Lock Bar Steel Pipe is 10 to 12 per cent greater than riveted pipe, according to tests made by the Bureau of Water, Philadelphia, Pa., on its 54,000 feet of 48-inch and 36-inch pipe.

A list of city installations of Lock Bar Steel Pipe will be furnished on request.

EAST JERSEY PIPE COMPANY

7 DEY ST., NEW YORK

LOCK-BAR

Before Closing

STRONG AS THE PLATE ITSELF

THE AMERICAN CITY

DEPENDABLE PIPE



A cordial invitation
to visit our exhibit
at the Detroit Water
Works Convention
is extended to all.

*6-foot lengths, convenient
to handle—easy to lay.*

UNIVERSAL CAST IRON PIPE

THE CENTRAL FOUNDRY COMPANY

Subsidiary of

IRON PRODUCTS CORPORATION

Executive Offices: 41 EAST 42nd STREET, NEW YORK

THE AMERICAN CITY

DETROIT WATER SUPPLY



*No lead, no calking, no bell
holes—wrenches the only tools.*

Universal 12-inch
line in same
trench with 48-
inch steel pipe.
Contractors: The
Gillespie Con-
tracting Co.

UNIVERSAL CAST IRON PIPE

THE CENTRAL FOUNDRY COMPANY

Sales Offices:

NEW YORK

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SAN FRANCISCO

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CAST IRON PIPE AND FITTINGS

American Cast Iron Pipe Company

Birmingham, Ala.

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LYNCHBURG FOUNDRY COMPANY

Manufacturers of

CAST IRON PIPE AND FITTINGS

Main Office: LYNCHBURG, VA.

Works at Radford, Va., Lynchburg, Va.

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MANUFACTURERS OF

CAST IRON PIPE

FOR WATER AND GAS

ALSO SPECIAL CASTINGS AND FLANGE WORK

National Cast Iron Pipe Co.

Birmingham, Ala.

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Cast Iron Water and Gas Pipe

Sales Offices:

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Great Southern Life Bldg.	Rialto Building
Dallas, Texas	San Francisco, Cal.

JAMES B. CLOW & SONS

General Offices:

534-546 S. Franklin Street, Chicago

Works:

Coshocton, O. Chicago, Ill. Newcomerstown, O.

Sales offices in all principal cities

**Manufacturers of Cast Iron Pipe and
Fittings**

GLAMORGAN PIPE & FOUNDRY COMPANY

LYNCHBURG, VA.

General Founders and Machinists

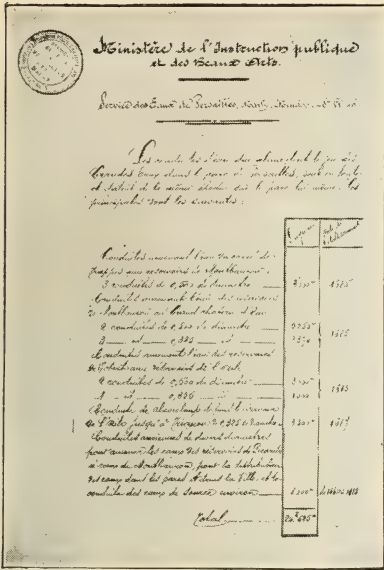
Manufacturers of

Cast Iron Pipe

For Water and Gas, Flange Pipe and Fittings

Western Office: 543 The Bookery, Chicago

Above advertisements paid for by The Cast Iron Pipe Publicity Bureau



This certificate, dated 1903, gives the dates of laying of the various mains. The earliest is 1664, the latest 1688.



Still in Service After 250 Years

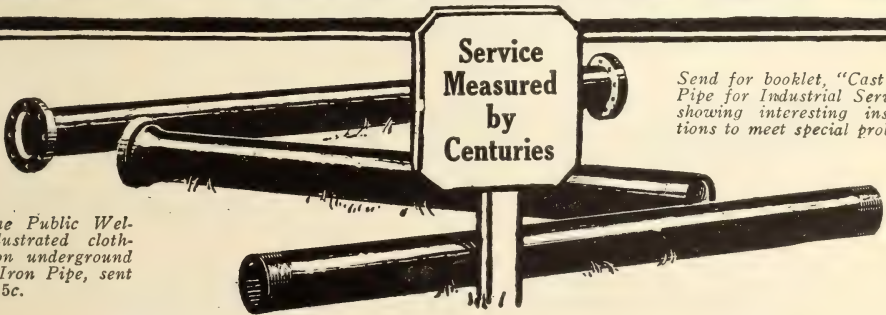
To the patient researches of M. Blanc, Chief Inspector of the Water Service of Versailles and Marly, we owe the proof of the antiquity of this Cast Iron Pipe, laid in the reign of Louis XIV of France.

A later report says: "These conduits seem to be able to furnish service for a very considerable time longer."

The high resistance of this Cast Iron Pipe to corrosion may be judged from the clearness of the fine "parting line" produced by the old horizontal method of casting.

THE CAST IRON PIPE PUBLICITY BUREAU, Peoples Gas Bldg., Chicago

CAST IRON PIPE



Send for booklet, "Cast Iron Pipe for Industrial Service," showing interesting installations to meet special problems

"Pipe and the Public Welfare," an illustrated cloth-bound book on underground uses of Cast Iron Pipe, sent postpaid for 25c.

THE AMERICAN CITY

Chemicals for Water Purification

We manufacture the highest grades of

Sulphate of Alumina

Chloride of Lime

and

Liquid Chlorine

PENNSYLVANIA SALT MFG. CO.

WIDENER BLDG.

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PHILADELPHIA, PA.



NORFOLK, VA., FILTER PLANT

Most of the water works
FILTER PLANTS, most
of the swimming pool
RE-FILTRATION SYS-
TEMS, and the majority
of all the other **FIL-**
TERS in the world have
been furnished by us.

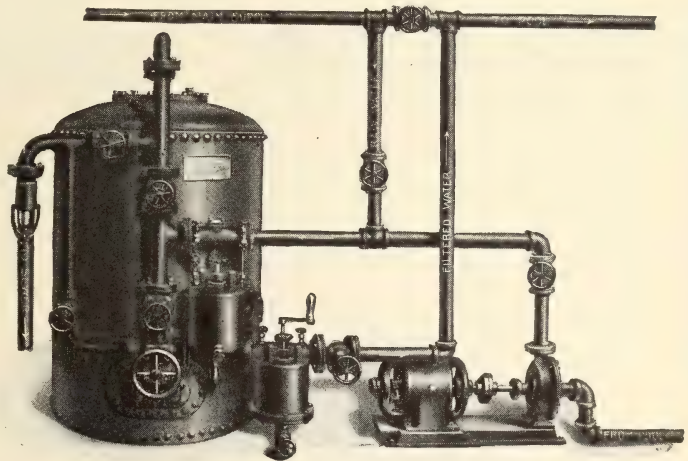
Doesn't that mean something to you?

Then, too, we control the outstanding improvement of this genera-
tion in Mechanical Filtration

THE WHEELER FILTER BOTTOM

The NEW YORK
SECTIONAL
WASH FILTER is
THE filter for
Swimming Pool re-
filtration systems.

*Send for bulletin
No. 23-1 and
learn why.*



The New York Continental Jewell Filtration Co.

General Offices and Works: Nutley, N. J.

NEW YORK

CHICAGO

MONTREAL



FILTER ALUMS

are efficient and economical agents in maintaining a continuous supply of pure, sparkling water. They are of high quality, and are uniformly effective under the most severe tests of high turbidity.

Let us quote on your requirements.

E. I. du Pont de Nemours & Co., Inc.

Lithopone, Pigments and Heavy Chemicals Division

3500 Gray's Ferry Road,
Philadelphia, Pa.

256 Vanderpool Street,
Newark, N. J.

Pure Water

We manufacture filters for all domestic, industrial, and municipal requirements.

For over twenty-five years Roberts Filters have been supplying pure, clean water.

Write for descriptive literature.

Roberts Filter Mfg. Co.
DARBY, PA.

FOR PIPE USERS

TAYLOR'S SPIRAL RIVETED PIPE

Offers great strength, durability and economy. For high pressure water supply and intake mains and piping for special purposes.

Send for copy of our production book giving full information.

AMERICAN SPIRAL PIPE WORKS
P. O. Box 485 CHICAGO, ILL.

The Best Material for **CALKING**
Joints in Cast Iron Pipes is

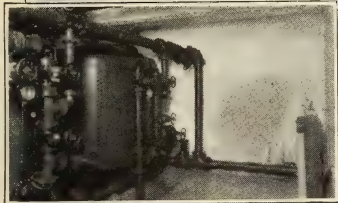
Ulco Lead Wool

IN ROPE FORM

Write for particulars to

UNITED LEAD COMPANY
111 BROADWAY, N. Y. CITY

Municipal Pool at Memphis



Cascade Pool at Nashville

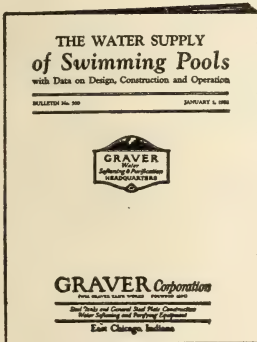
When building a municipal swimming pool (as many communities are doing now), the problem of a safe water supply must be considered.

To maintain a constant flow of fresh water from city mains would be an unnecessary drain on the water supply facilities and would not keep the pool and water in a wholesome condition at all times.

With the installation of a GRAVER Recirculating and Refiltering System the same water is used over and over again—circulating constantly through filters, sterilizers (and, on indoor pools, through heaters), maintaining hygienic purity at all times as well as water that is clear and sparkling.

A pool, **GRAVER** equipped, is a safe pool.

*A special bulletin No. AC-500,
"Water Supply for Swimming Pools"
will be sent to you on request.*



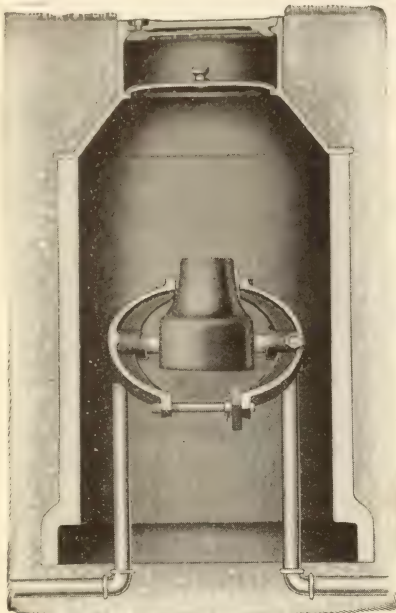
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GRAVER Corporation
(WM. GRAVER TANK WORKS • FOUNDED 1857)

*Steel Tanks and General Steel Plate Construction
Water Softening and Purifying Equipment*

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30° Below Zero and not a meter out of commission

"We have experienced no trouble with freezing with the temperature as low as 30 degrees below zero," writes the superintendent of the Water Department in Waukesha, Wis., commenting on Ford Meter Boxes.

This is not the only case, for water works men of the East, West and Middle West—in cities where Ford Meter Boxes have been in operation during the severest weather—have given testimony to the absolute protection afforded by Ford Meter Boxes.

In cities where water enters the box at freezing temperature, the conservation of every possible heat unit is necessary. The patented Wabash Double-Lid Cover, shown above, accomplishes this purpose—it removes all danger of freezing. Its patented construction retains all the heat given off by the meter as well as the heat rising from the bottom of the box.

Wabash Double-Lid Covers are recommended for all locations north of the 39th parallel—because they make meters freeze proof.

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The Ford Meter Box Co.
406 S. Carroll Street
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Security Rods are made from second-growth hickory, with malleable iron couplings swedged or shrunk down very tightly on the curved places at end of sticks. Security couplings *cannot* come off.

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For Water, Sewage, Gas, Air, Steam—
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Have 50% greater capacity than any other. If your well ends in sand or gravel you need one. Insures continuous use.

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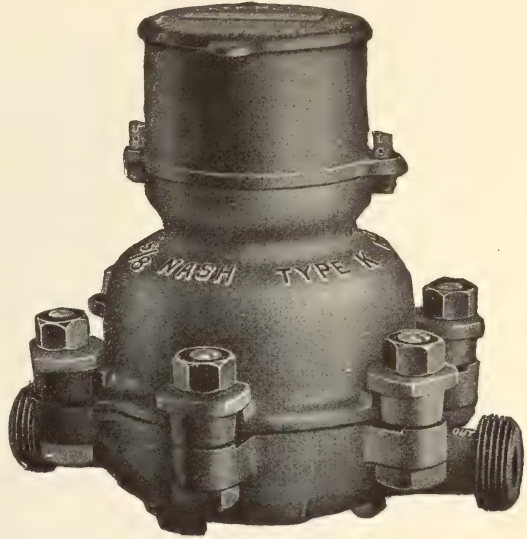
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WATER METERS

NASH TYPE K DISK MODEL

We have been making disc meters since 1888. Our experience is built into the Nash Type K. It has every worthwhile modern improvement, and we confidently recommend it as a thoroughly practical, satisfactory, water measuring device.



The Best Disc Meter

The Nash Type K is an all bronze meter, accurate, well made and durable. The case has a snap joint without screws. The disc is extra large and slow moving. The intermediate is enclosed. The register is straight-reading. The meter is simple in construction and easy to take apart without removing from service pipe.

We have been in the business for over fifty years, and make all types of water meters; we consequently know pretty well how they should act under hard service. We do not hesitate to say that we consider the Nash Type K the best disc meter on the market today.

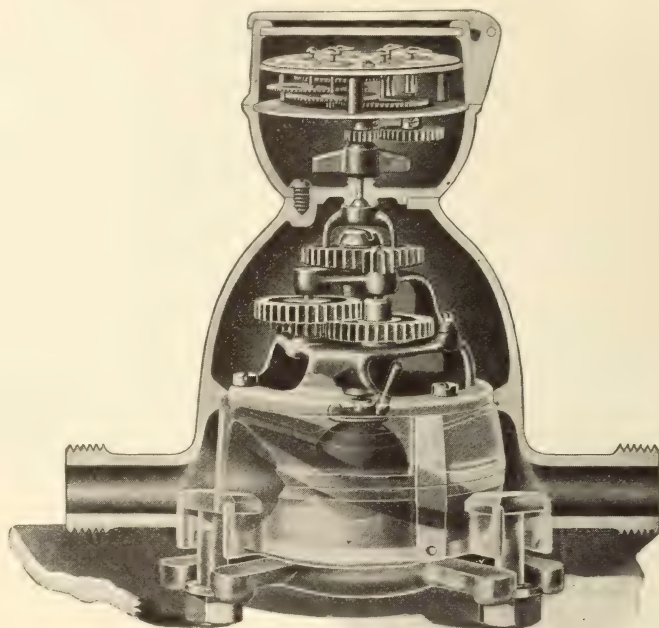
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"WATCH DOG" $\frac{5}{8}$ " FROST PROOF.

**"WATCH DOG" Meters are Standard
and comply with American Water
Works Association specifications.**

MORE THAN 800,000 IN SERVICE

GAMON METER COMPANY

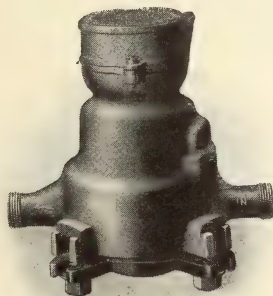
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*Meters for Water, Gas, Oil, Gasoline, Air,
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Introducing
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The ARCTIC is the
only meter on the
market embodying
this feature.

Another Annoyance Eliminated

No more Gasket troubles. Our FIBRE GASKET (Patent Pending) used in ARCTIC Meters in connection with the rubber gasket between the upper case and the frost bottom plate, does away entirely with sticking and torn gaskets.

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Columbia, S. C., 1433 Main Street
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Los Angeles, Union Bank Building

75,000 TONS OF COAL POURED INTO THE OCEAN

by one state in one year would shock the most careless citizen, yet these startling facts are clear in the figures of the official New York state reports.

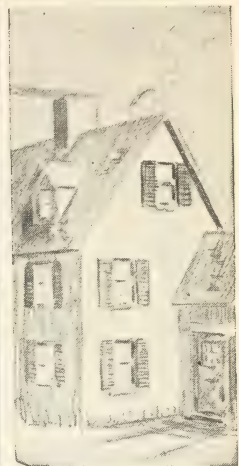
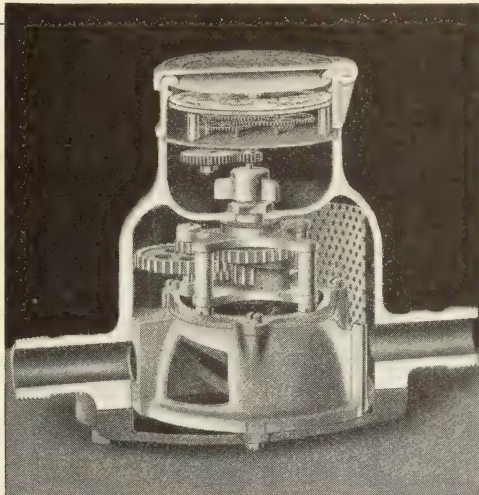
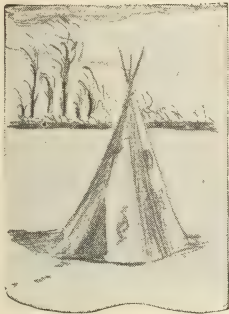
The New York State Bureau of Municipal Information found that in cities universally metered from 85 to 100 gallons of water per capita per day were used. Cities less than one per cent metered averaged 305 gallons. Millions of gallons of water now being pumped to consumers is wasted daily and as a result thousands of tons of coal are unnecessarily consumed each year. By reducing leakage and waste of water so that the daily per capita consumption will not exceed 100 gallons, nineteen New York cities could have saved these 75,000 tons of coal each year, and coal today is a bigger item than ever before.

The most effective means of preventing waste is the installation of meters. It conserves water supply, reduces the cost of plant operation and eliminates waste of fuel.

Union Water Meter Company has been making high grade meters since 1868. They are designed and constructed on sound scientific principles that have made them generally regarded as standard.

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METER COMPANY
WORCESTER, MASS.**

FOUR HUNDRED YEARS



All Endurance Records Broken

A 5/8" Hersey Disc Meter No. 835,514 on an endurance test at the Meter Testing Laboratory of the Water Department at Newark, N. J., registered 3,902,164 cubic feet of water without being repaired or even opened for examination. It was tested for accuracy and sensitiveness at each 100,000 cubic feet, and these tests showed a falling off in accuracy the first million feet of but 4/10ths of one per cent, 1-5/10ths the second, 1-4/10ths the third and 7/10ths the last 902,164 feet, or but 4% all together.

The Meter continuously responded to the sensitive test of a 1/64" stream from the first and through all tests to the very last.

400 Years

The test was "continuous running" at a rate of about 3-3/5 cubic feet or 27 gallons per minute from February 27th, 1920, to March 28th, 1922.

3,955,364 cubic feet of water is equal to 400 years' service at 10,000 feet per year.

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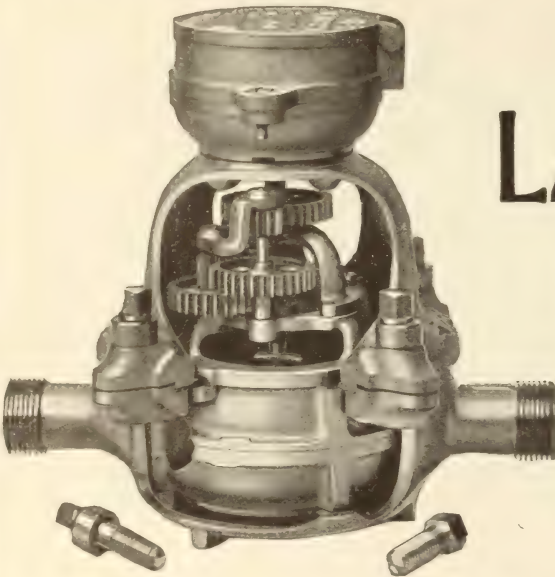
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You Cannot Go Wrong

using

LAMBERT WATER METERS



because

The Name LAMBERT Means the Best

The Lambert frost-proof disc meter is made in $\frac{5}{8}$, $\frac{3}{4}$ and 1-inch sizes. By the use of a patented, non-corrosive, yielding bolt device, the top and bottom casing, disc chamber and gear train are free to part when the meter is frozen, thereby preventing any damage to the casing or internal mechanism. The disc chamber is the same as in the regular Lambert meter, the disc and roller being interchangeable and the same style of gear train is used in the two meters.

For heavy duty under the highest pressure commonly employed, where accuracy on very small flows is not an important factor, the Lambert current type meter is recommended. In all sizes, Lambert current meter casings, including the main casings, are made of bronze composition.

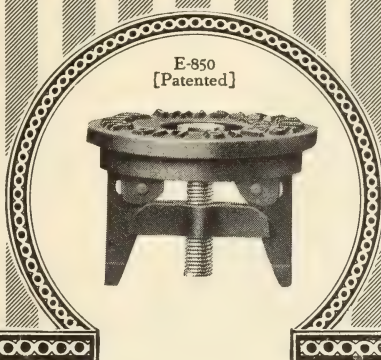
Lambert current duplex meters are designed for heavy duty under the highest pressures commonly employed where accuracy on all flows is an important feature. The Lambert duplex will register accurately from the lowest flow to the full volume for which the meter is designed. It is made in sizes from 2 to 10 inches inclusive.

Descriptive circulars will be sent free on request.

THOMSON METER CO.

100-110 BRIDGE ST.

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E-850
[Patented]

Old Service Boxes Made 100% Efficient

By the use of **MUELLER** Repair Lids at a nominal cost—every uncovered service box is a menace—an invitation to damage suits for personal injury—an expense for cleaning out if the curb cock must be reached.

MUELLER Service Box Repair Lids

once installed are better than the original lid—they can't be removed without the special pentagon wrench—they are made in the 2½" size for the old and new style Buffalo service boxes—what appears an old worn out box can be made as good as new. **MUELLER** Service Box Repair Lids do the trick.

Ask us about them—fully warranted.

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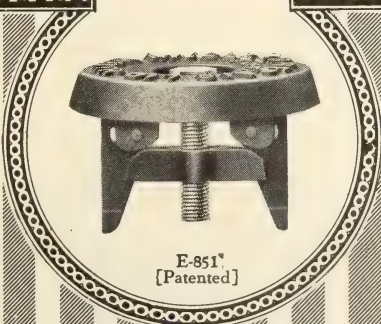
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Phone Pennsylvania 2468

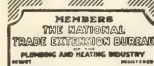
Sarnia, Ontario, Canada

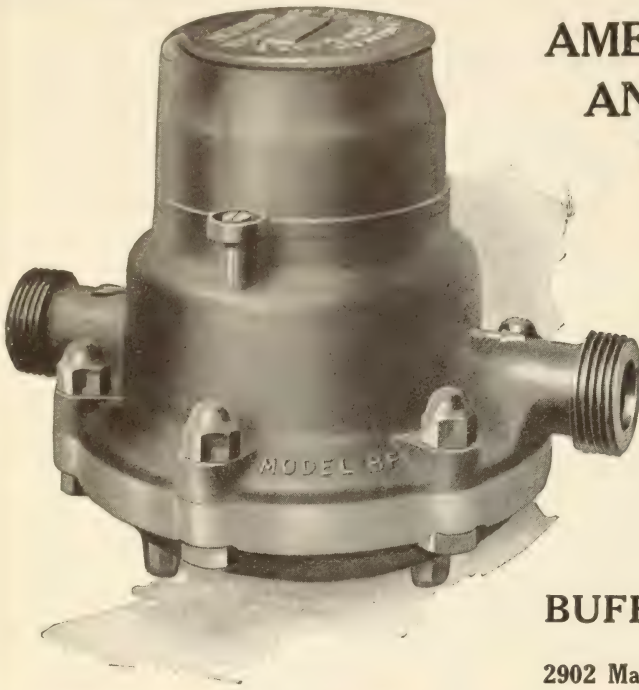
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Phone Sutter 3577

Mueller Metals Co., Port Huron, Mich., Makers of "Red Tip" Brass Rod; Welding Rod; Brass and Copper Tubing; Forgings and Castings in Brass and Bronze; also Brass Screw Machined Products.



E-851
[Patented]





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are made in ten pipe sizes, from $\frac{1}{2}$ in. to 4 in. inclusive—in four styles of outside casings, the breakable frost bottom type is illustrated herewith—with either round reading or straight reading registers—with submerged working parts of one best model, built of hard rubber and bronze composition.

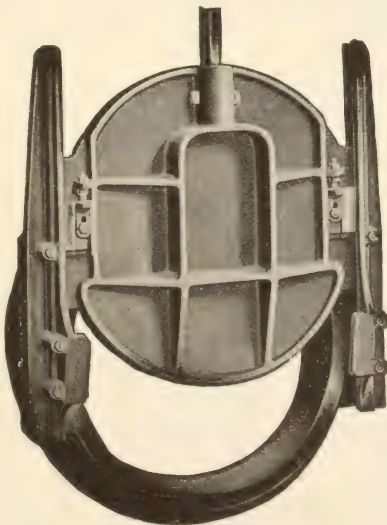
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The kind that don't wear out

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Scientifically houses and protects the water meter in every climate and under all conditions.

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*Everything for the
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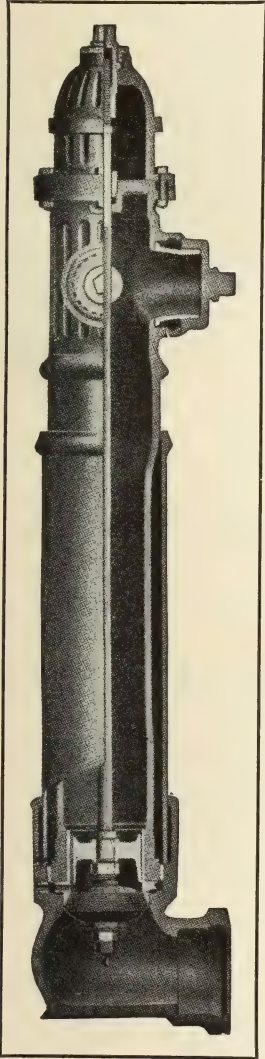
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Made in Standard
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Frost-Proof—
Positively Automatically Drained—
Always Dependable

GATE VALVES
For All Purposes

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Smith Fire Hydrants are scientifically constructed by engineers to deliver the greatest volume of water under a given pressure.

Smith Fire Hydrants are designed with easy-flow waterways without detours or obstructions which have a tendency to kill efficiency and retard the flow. This hydrant is built strictly along hydraulic principles to meet the exacting demands of modern fire equipment.

Compare this hydrant with other hydrants under parallel and static conditions, and you will find that the Smith hydrant produces the greatest volume at the nozzle, with low frictional loss.

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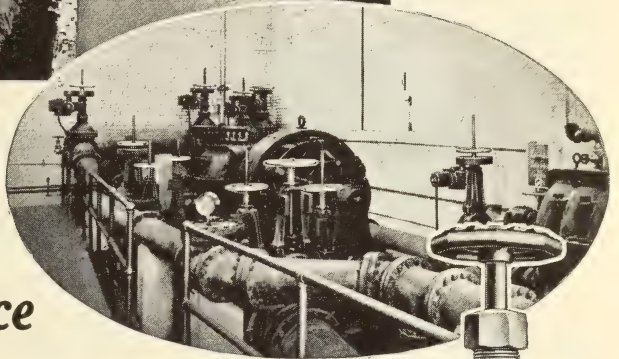
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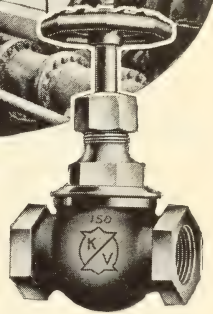
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*In every
water works service*

from reservoir gate to house service valve

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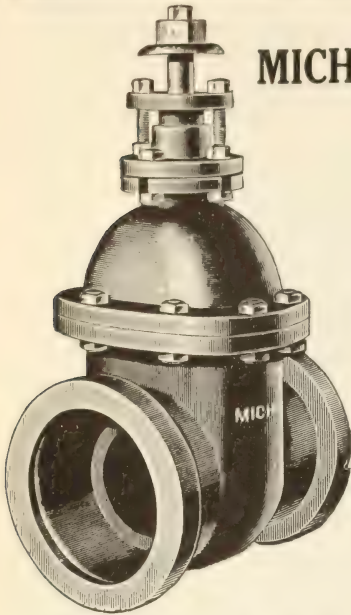
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QUALITY and precision are the hallmarks of "Michigan" products. Backed by the experience of 55 years of effort intelligently directed, and spurred by a willingness to serve that is typified within the organization by the slogan, "Go Ahead," we are equipped and ready to execute commissions calling for the highest standards of dependability.

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Garbage and Refuse Incinerators for Municipalities

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D. & D. Safety and Noiseless Cover

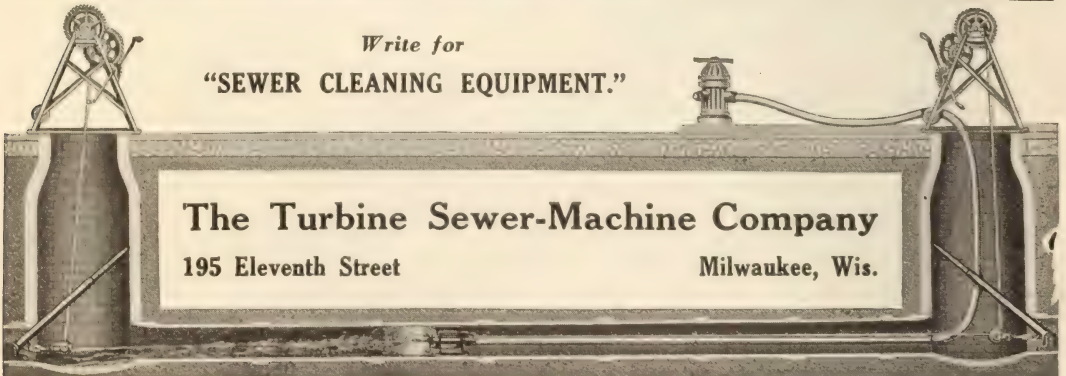
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We manufacture Manhole, Catch Basin and Sewerage Castings of all kinds. We make anything in Gray Iron. Write for our prices.

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195 Eleventh Street

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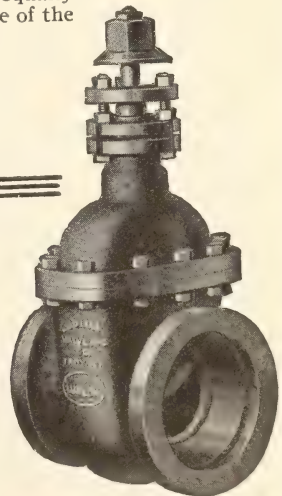
7 Reasons for Using Ludlow Gate Valves

- 1 Ludlow valves are constructed on scientific principles of high grade iron and bronze.
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The Ludlow
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NOTICE TO BIDDERS

Sealed proposals for furnishing materials and doing all work required for the construction of Section 1 of the trunk sewer from Dover to Boonton and the Sewage Disposal Works will be received by the Board of Commissioners, in the Assembly Chamber of the City Hall, Jersey City, N. J.,

Tuesday, May 1st, 1923

at 3 o'clock P. M. (Daylight Saving), at which place they will be publicly opened.

Section 1 of the Trunk Sewer extends from Boonton to Powerville and includes approximately 3.2 miles of 24 to 39-inch sewer with manholes, appurtenances and other work incidental thereto.

Up to and including sewer of 27 inches in diameter, the material is to be salt-glazed vitrified terra cotta pipe, Alternate bids will be received on both segment block and monolithic reinforced concrete pipe with brick invert for the larger sizes.

The plant includes Settling Tanks, Sludge Digestion Tanks, Sludge Drying Beds, Contact Beds, Sand Filters, Disinfection Plant and auxiliary units.

Each bid must be accompanied by a certified check for \$100,000 payable to the City of Jersey City, as a guarantee that the Contractor will execute the contract if awarded, failing which said check shall be forfeited, and which said check shall be returned to the bidder on the execution of the contract. Check of unsuccessful bidders will be returned on the award of the contract. Proposals must also be accompanied by the consent in writing of a surety company authorized to do business according to the laws of the State of New Jersey, that, should the proposal be accepted, it will become surety in the full amount of the contract as provided in the specifications and in Chapter 75, P. L. 1918, forms of which is made part of the specifications.

Copies of the plans, proposal forms, specifications and forms of bond and contract can be seen at the office of Michael I. Fagen, Director, Department of Streets and Public Improvements, City Hall, Jersey City, N. J., or at the office of Clyde Potts, Consulting Engineer, 30 Church Street, New York City, or may be obtained by prospective bidders upon depositing twenty-five dollars (\$25.00), which sum will be refunded to Contractors who submit bids, on return of the plans within ten days after the contract has been awarded, if the same are in good condition when returned.

The deposit will not be refunded to parties who take out plans and do not submit proposals.

The Board of Commissioners reserves the right to reject any and all proposals.

BY ORDER OF THE BOARD OF COMMISSIONERS OF JERSEY CITY.

Dated City Clerk's Office,
Jersey City, April 6th, 1923.

EDWARD J. HOLLAND,
City Clerk,

NOTICE TO BIDDERS

Sealed Proposals for furnishing materials and doing all work required for the construction of Section 3 of the Trunk Sewer from Dover to Boonton will be received by the Board of Commissioners in the Assembly Chamber of the City Hall, Jersey City, N. J.,

Tuesday, May 1st, 1923

at 3 o'clock P. M. (Daylight Saving), at which place they will be publicly opened.

The work includes approximately 2.7 miles of 10-inch to 33-inch sewer with manholes, appurtenances and other work incidental thereto. Section 3 is within and adjacent to the Town of Dover.

Up to and including sewer of 22 inches in diameter, the material is to be salt-glazed vitrified terra cotta pipe. Alternate bids will be received on both segment block and monolithic reinforced concrete pipe with brick invert for the 33-inch sewer.

Each bid must be accompanied by certified check for \$10,000, payable to the City of Jersey City, as a guarantee that the Contractor will execute the contract if awarded, failing which said check shall be forfeited, and which said check shall be returned to the bidder on the execution of the contract. Checks of unsuccessful bidders will be returned on the award of the contract. Proposals must also be accompanied by the consent in writing of a surety company authorized to do business according to the laws of the State of New Jersey, that, should the proposal be accepted, it will become surety in the full amount of the contract as provided in the specifications and in Chapter 75, P. L. 1918, form of which consent is made part of the specifications.

Copies of plans, proposal forms, specifications and forms of bond and contract can be seen at the office of Michael I. Fagen, Director, Department of Streets and Public Improvements, City Hall, Jersey City, N. J., or at the office of Clyde Potts, Consulting Engineer, 30 Church Street, New York City, or may be obtained by prospective bidders upon depositing ten dollars (\$10.00), which sum will be refunded to Contractors who submit bids, on return of the plans within ten days after the contract has been awarded, if the same are in good condition when returned.

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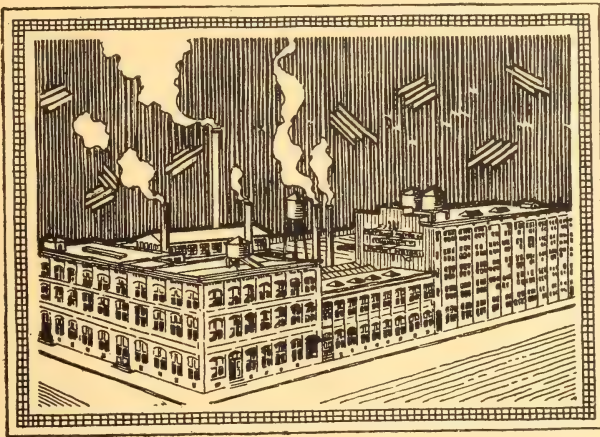
The Board of Commissioners reserves the right to reject any and all proposals.

BY ORDER OF THE BOARD OF COMMISSIONERS OF JERSEY CITY.

Dated City Clerk's Office,
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EDWARD J. HOLLAND,
City Clerk.

**A STORY
WORTH READING**



**TRIDENT
METERS**

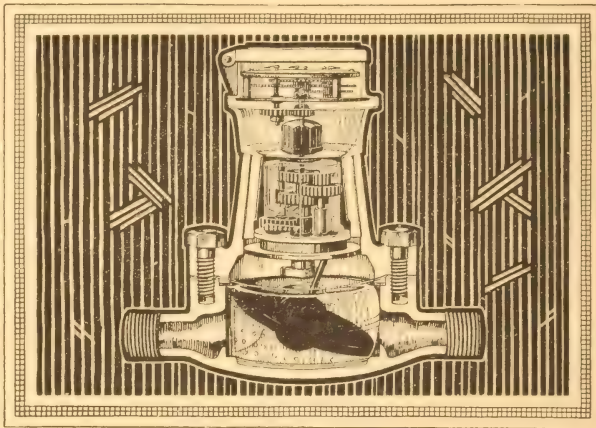
Made where the spirit of
Craftsmanship
dominates
automatic machinery

NEPTUNE METER COMPANY

50 EAST 42nd STREET, NEW YORK
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Makers of the Trident Water Meter

TRIDENT



Why do we gauge Trident gear train parts 73 times during production and assembling? There are 27 parts to the Trident gear train and they must work together with unfailing accuracy and they must be strictly interchangeable. Hence, the insistence on meticulously careful gauging at every step in the many operations of finishing and assembling. The story of the making of a Trident gear train just as you would see it done in the factory, has been told in Letter No. 6 of the famous "Dear Jim" letters.

NEPTUNE METER COMPANY

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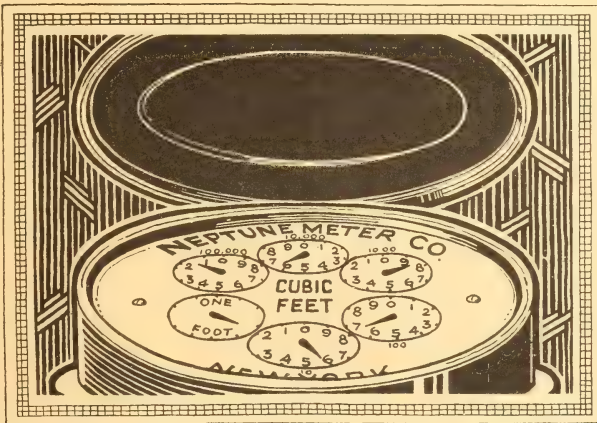
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METERS



If your name is on our mailing list, you have already received Letter No. 7 of the "Dear Jim" letters for meter users. You may be one of the thousands of men who have read Trident meter registers. Now read how they are made. Do you know the difference in the manufacturing processes between the straight and round reading registers? Bill's letter No. 7 is not a cold-blooded, technical "treatise," but a human man-to-man story of an intensely interesting process. If you have not received it, write for it.

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Letter No. 5—"The Disk and Spindle."

Letter No. 6—"The Trident Gear Train."

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**The story of the Making of a Trident
Meter told so you will enjoy reading it**

NEPTUNE METER COMPANY

50 EAST 42nd STREET, NEW YORK

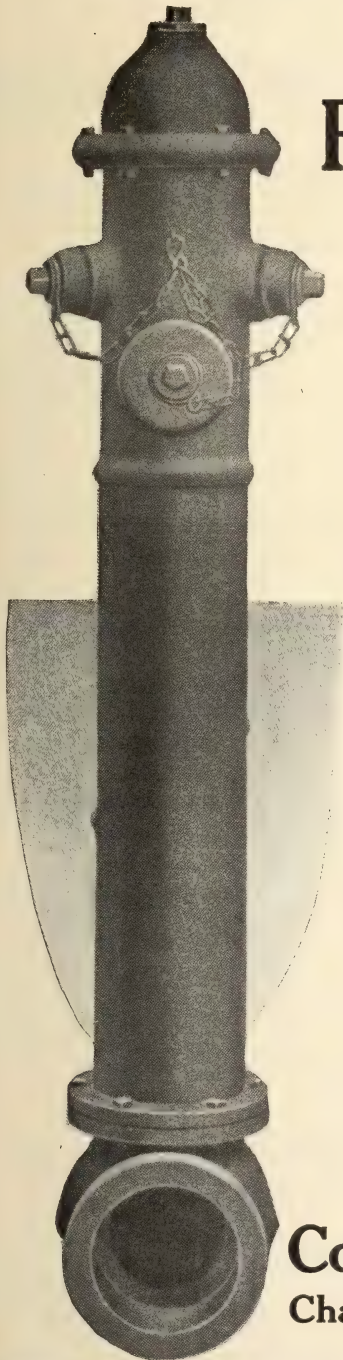
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Makers of the Trident Water Meter

EXTREME SIMPLICITY IN FIRE HYDRANTS



Practical water-works superintendents who have had to contend with some of the more complicated fire hydrants will appreciate the extreme simplicity of the Columbian Fire Hydrant. There is complete absence of any uncertain features in operating the main valve. All of the working parts are removable from the top of the hydrant without disconnecting or disturbing the hydrant in any way. The double drain is positively operated. The hydrant barrel has an extra large waterway with no cross obstructions at any point to impede the flow of water.

COLUMBIAN HYDRANTS

insure perfect interchangeability as all machine parts and working parts are made to permanent steel gauges. The ring seat which is screwed into the hydrant shoe and the valve closing with the pressure permits the repacking of the stuffing box and also makes it possible to make any repairs from the shoe up without shutting off the water. The solid valve stem connecting the main valve with the bronze stem nut helps to make the full opening and closing of the hydrant an absolute certainty. The absence of wedging gate devices and angle flap valve schemes makes its operation sure under all conditions.

Send for our leaflet showing the Columbian Fire Hydrant in section and describing it in detail.

Columbian Iron Works
Chattanooga **Tennessee**

TRADE **"LEADITE"** MARK

REGISTERED U. S. PATENT OFFICE

For Jointing Cast Iron Water Mains



60" c. i. pipe laid with Leadite joints at Queen Lane Filter, Philadelphia, Penna.

**NO
CALKING**

LEADITE IS THE PIONEER SELF-CALKING SUBSTITUTE FOR PIG LEAD

Be Sure It Is LEADITE, and Accept No Imitations.

THE LEADITE COMPANY, Inc.

100 S. Broad Street

Philadelphia, U. S. A.

PHILADELPHIA USES IT

Leadite has been tested and used for making joints in cast iron bell and spigot water pipe for more than 30 years.

Leadite is used successfully on all sizes of pipe from 4" to 60" in diameter.

Thousands of miles of pipe laid with Leadite are in service.

Leadite is used in all parts of the world by water works, railroads, mines, industrial plants, and contractors, under all pressure and conditions encountered in water works construction.

Leadite is used with excellent results under railroad tracks and over bridges where the vibration is severe on any joint.

One ton of Leadite is equivalent to four tons of pig lead, based on the joints being made the same depth with either material.

Leadite joints cost only one-half to one-fourth the cost of lead joints, owing to the saving effected in material and labor.

Leadite saves excavation, digging of large bell-holes, trench pumping, and other work incidental to caulking.

Why continue to caulk when you can make bell and spigot joints without caulking, and save time and money?

Water works men, abreast of the times, are using Leadite.

THE **FEDERAL** WATER METER

**New—Unequalled in Excellence
Ready to Deliver—NOW**

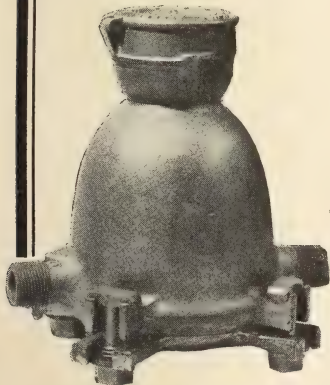
The FEDERAL Meter has been designed to meet the demand for a better Water Meter, better in design, better in construction, higher in quality, and finer in workmanship.

It contains VITAL improvements, the result of exhaustive investigation, experiments, and tests by meter specialists of wide experience and highly trained engineering experts.

The FEDERAL Meter can be more easily and quickly assembled and taken apart than any other meter on the market. The MERE REMOVAL of the casing nuts completely releases the entire internal mechanism.

The sole contact between chamber and casing is at the outlet port. This novel construction ensures absolute water-tightness, thereby increasing sensitiveness and accuracy.

The FEDERAL is the only ($\frac{5}{8}$ ") meter whose register records up to ONE MILLION cubic feet—or Ten Million gallons. Its center sweep hand helps both meter tester and meter reader.



**THE *FEDERAL*
METER CO.
BROOKLYN, NEW YORK**



CRANE SANITATION EQUIPMENT INCLUDES FIXTURES IN A WIDE RANGE OF STYLES AND TYPES FOR EVERY CLASS OF SERVICE

GREATER CONVENIENCE IN BUYING

Crane service, by providing full stocks of sanitation fixtures and piping for all standard or special needs, saves you time and expense when buying equipment. For comfort stations and other public buildings, Crane sanitation appointments are supplied in sturdy patterns to withstand the hardest usage. Crane valves,

fittings and steam specialties for the piping of heating and power plants, pumping stations and water systems, are accurately designed, carefully produced and individually tested to insure endurance. All deliveries are made from convenient branch houses, in the principal cities and shipping centers of the country.

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CRANE EXPORT CORPORATION: NEW YORK, SAN FRANCISCO

CRANE, PARIS



Standard Gate Valve for Water, No. 462
Standard Gate Valve for Steam, No. 461

EDDY FIRE HYDRANTS

HAVE THE FOLLOWING POINTS OF SUPERIORITY:--



No digging is necessary, for by taking off the cover one man can easily remove the working parts from the standpipe.

No derrick or hoist is required to take the Hydrant apart, nor is a special wrench necessary.

A damaged valve can be replaced by one man in a few minutes and at slight expense.

If the cover should be removed or the standpipe should be broken, no loss or damage can occur due to water escaping, as the valve is held in position from the bottom.

There is a large water way around the Valve when it is opened, and for this reason the **maximum efficiency** is obtained with this Hydrant under fire conditions.

Water hammer is avoided by the Valve closing against the pressure and the use of the cut-off under the Valve, which gradually closes it.

Hydrant Stems cannot be bent while using them, as the lower end engages in a threaded nut in the bottom of the Hydrant, and it is simply a case of tension and torsion.

Valve Rubbers are of a quality best adapted for the purpose.

The Bronze Valve Seat is slightly tapering, thus nothing can lodge on it to prevent closing of the Valve.

Frictional loss is reduced to a minimum.

The Drip Rod is at the side of the Hydrant standpipe and independent of the stem. **It can readily be adjusted and can as easily be removed from the standpipe with the main valve closed, without shutting off the water in the street.**

The Drip is automatic and positive in its action, and drains all the water from the standpipe.

With no water in the standpipe, it cannot freeze.

The opening and closing of the Hydrant Valve causes the stem to **raise or lower**, thus **INDICATING** the position of the Valve at all times.

The hydrant is thoroughly bronze mounted at all bearing parts, efficient, durable, simple in construction and free from the need of costly repairs to keep it in order.

For flushing purposes it has no equal. **Whatever can pass the Valve opening will pass out of the standpipe.**

No Frost Case is necessary, as all the parts can be removed through the standpipe.

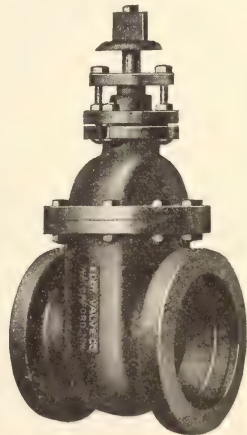
EDDY VALVE COMPANY

WATERFORD, N. Y.

Manufacturers of

**FIRE HYDRANTS
GATE VALVES
CHECK VALVES
FOOT VALVES
INDICATOR POSTS, Etc.**

James B. Clow & Sons, Chicago Agents



THE "IOWA"

Patented

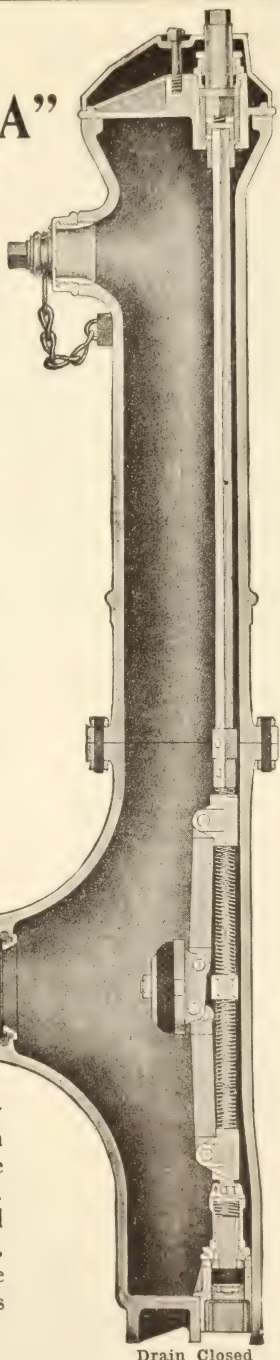
Fire Hydrant

The best
therefore
not the
oldest

If you are
not using the
"IOWA"
fire hydrant,
investigate the
superior de-
sign and many
advantages.

Covers every
requirement in
perfect fire
hydrant.
Established
15 years,
throughout the
United States
and Canada.

**THE IOWA VALVE
COMPANY**
Oskaloosa, Iowa



Drain Closed

NORTHERN ROTARY PUMPS

"MORE GALLONS PER HORSE POWER"

Our Trade Mark Tells Our Story

Over six hundred Northern Rotary
Pumps are in Fire Department ser-
vice and the number is rapidly in-
creasing.

Let Us Tell You Why

NORTHERN FIRE APPARATUS CO.

900 18th Ave., N. E.

MINNEAPOLIS, MINNESOTA, U. S. A.

Statement of the Ownership, Management, Circulation, etc., Required by the Act of Congress of August 24, 1912, of The American City, Published Monthly at New York, N. Y., April 1, 1923.

State of New York, County of New York, ss:

Before me, a Commissioner of Deeds, in and for the State and County aforesaid, personally appeared EDGAR J. BUTTENHEIM, who, having been duly sworn according to law, deposes and says that he is the Business Manager of THE AMERICAN CITY and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher	THE CIVIC PRESS, Inc., 443 4th Ave., N. Y. C.
Editor	HAROLD S. BUTTENHEIM, " "
Managing Editor	HAROLD S. BUTTENHEIM, " "
Business Manager	EDGAR J. BUTTENHEIM, " "

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock).

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3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: (If there are none, so state) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for statements embracing affiant's full knowledge and beliefs as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

EDGAR J. BUTTENHEIM, Business Manager

Sworn to and subscribed before me

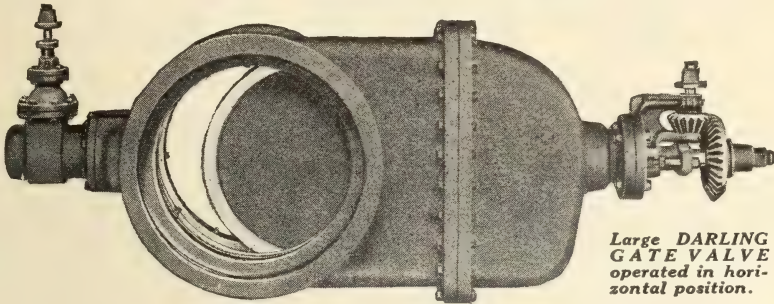
this 1st day of April, 1923

New York County Clerk's No. 59.

(My commission expires February 13, 1925.)

H. RADMIFF

Commissioner of Deeds



*Large DARLING
GATE VALVE
operated in hori-
zontal position.*

DARLING GATE VALVES

For Water Main Service

It may not be necessary to touch a gate valve over a long period of time but sooner or later the emergency will arrive. When that time comes quick action is essential.

The biggest Darling Gate Valve can be opened or closed by one man easily and quickly. The discs, a feature of Darling Valve construction, serve as wheels and carry the load as no other type of valve can. Since these discs revolve, seating in a different place each time the valve is operated, uneven wear is prevented.

Detailed information on request



DARLING VALVE & MANUFACTURING CO.
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Also manufacturers of the DARLING FIRE HYDRANT

PROOF

that the
**NATIONAL
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of **CLEANING
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is
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Cambridge, Mass.	6
Newport, Ky.	5
Methuen, Mass.	5
Salt Lake City, Utah.	5
Pittsburgh, Pa.	4
Jersey City, N. J.	4
<i>etc.</i>	

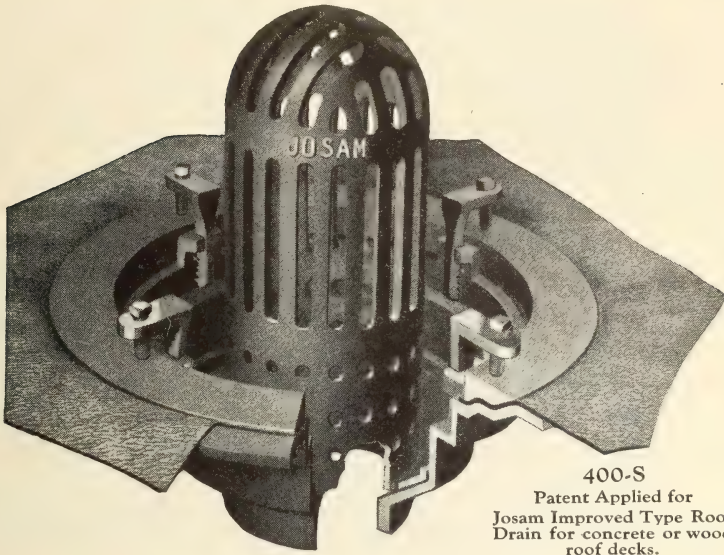
There is no better proof of the good results from the cleaning of water mains by the National Method, than to submit to you a list of the cities where we have done work and call your attention to the number of repeat contracts secured. Above, you will see a portion of a single page of our booklet "Proof," in which these cities are listed alphabetically.

The efficiency of your plant requires clean mains and it is obviously cheaper to clean the old mains than to lay new ones. The thousands of minute tuberculations in your mains greatly retard the flow of water, thereby reducing the carrying capacity of the mains and greatly reducing the pressure through friction. The removal of these tuberculations by the National Method is simple and not expensive and it restores the water mains practically to their original carrying capacity. Send for a copy of our booklet "Proof," and learn more about the National Method of cleaning water mains, which has proven so satisfactory in hundreds of cities in the United States.

The NATIONAL WATER MAIN CLEANING CO.

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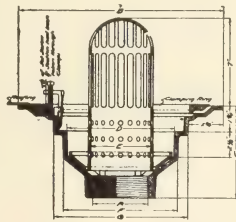


400-S
Patent Applied for
Josam Improved Type Roof
Drain for concrete or wood
roof decks.

A New Roof Drain Development

MANY public buildings of every description throughout the country are equipped with Josam drains. Now Josam offers its latest achievement the 400-S roof drain. This is the drain that affords an absolutely water-tight connection between the roofing and the drain body without the use of flashing. This is made possible by the improved type clamps and clamping ring which securely hold roofing into drain body without any danger of fracture to roofing felts.

The clamping ring is held securely in place by four adjustable clamping posts of manganese bronze which are tapped to receive a $\frac{3}{8}$ -inch galvanized set screw. Simply tightening these screws permits any desired pressure on the clamping ring, under which the roofing felts are clamped.



Cross Section of the
400-S Roof Drain
Made with 2, 3, 4, 5, 6
and 8-inch Outlet.

The 400-S Roof Drain is furnished with Josam removable combined sediment cup and strainer. The body of the drain has a total depth of $6\frac{1}{4}$ in. over all, making it applicable to all thicknesses of roofs.

*Our Catalog F explains in detail the complete
Josam line. Write for your copy.*

The Josam Manufacturing Company

Factories: 2nd & Canal Road

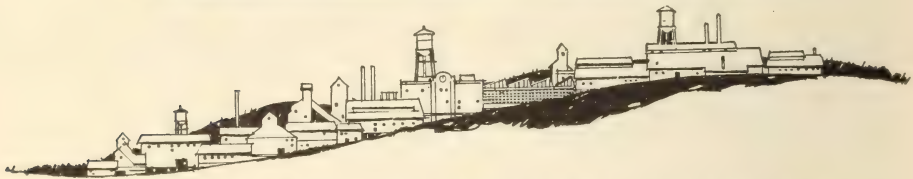
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**"There are no Substitutes
for Josam Drains"**

Josam
TRADE MARK REG
DRAINS
**STANDARD
OF AMERICA**



REDUCE PUMPING COSTS

in the operation of your Municipal Water Plant by installing a Pittsburgh-Des Moines Elevated Steel Tank of ample height and capacity. Direct pressure for domestic service is very wasteful of fuel and labor, as well as uncertain for fire protection. Pumps operate most economically on full capacity and this condition is always obtained by using a Pittsburgh-Des Moines Elevated Steel Tank. In many cases night pumping can be entirely eliminated, thus reducing the labor cost one-half. The saving made by installing a Pittsburgh-Des Moines Elevated Steel Tank will pay all the cost in a very few years.

We have demonstrated these facts to hundreds of towns and cities and private Water Companies in all parts of the Country, to their entire satisfaction and financial benefit. We solicit the opportunity of demonstrating our claims to your City.

Our Engineers will advise on your situation without expense or obligation on your part.

Write our nearest office. Ask for Catalog No. 34.

Pittsburgh-Des Moines Steel Co.

834 CURRY BLDG., PITTSBURGH, PA.

DISTRICT OFFICES:

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PITTSBURGH

DES MOINES



At Tulsa, Okla.

Lock Joint Pipe Co.

15 Rutledge Ave.

Ampere, N. J.

TULSA continues to have the best, and right now a big army of men are busily engaged there in installing fifty-two miles of "Lock Joint Pipe"

LOCK JOINT

Reinforced
Concrete Pipe

THIS conduit pres-sure pipe will bring to the city the waters of Spavinaw Lake through twenty-eight miles of 60-in. and twenty-four miles of 54-in. "Lock Joint Pipe"

A PITOMETER SURVEY IN DETROIT FOUND

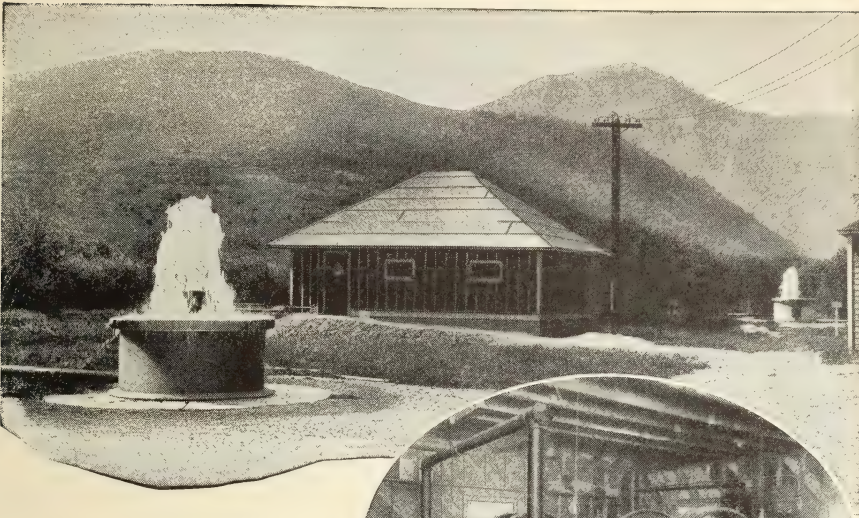
1. A total underground leakage of 9,557,000 gallons per 24 hours which was repaired by the Water Board. The two largest sources of water waste discovered were a 6-inch blow-out from a 42-inch main which was partly open and which was wasting 750,000 gallons per 24 hours, and a 6-inch main which was broken in two places and which was wasting 312,000 gallons per 24 hours.
2. Large industrial meters which were underregistering. In one case it was found that the department was losing the revenue from 432,000 gallons of water per 24 hours, due to the underregistration of a single meter. It is admitted that the loss in revenue due to the underregistration of large meters was approximately \$52,000 per year.
3. Considerable revenue lost due to the inability of house meters to register small flows. The Pitometer Survey discovered this fact and now these meters are being regularly removed to the meter shop for test and repair.
4. Many meters in the system larger than the consumption warranted. All such meters are now being replaced by smaller ones.
5. House waste due to fixture leakage amounting to 22,589,000 gallons per day.
6. Many defective and leaky valves which were repaired by the Department immediately.

PITOMETER SURVEYS HELP WATER DEPARTMENTS IN MANY WAYS

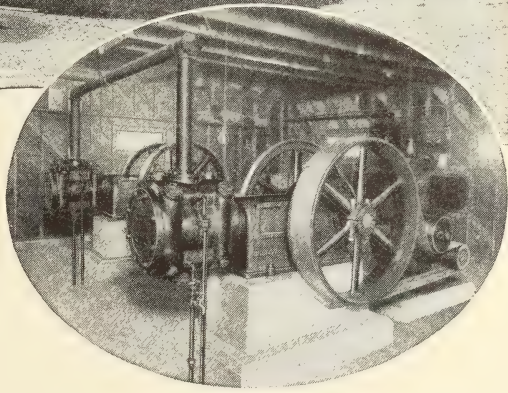
Pitometer engineers are pleased to confer with any municipal and water works officials regarding the value of a water waste survey conducted along the high professional plane of the Pitometer Company. These water waste surveys invariably discover leaks, blown joints, defective valves, meters that underregister, and broken pipes, all of which, when repaired, mean tremendous savings to the Water Department, thus increasing its revenue and frequently deferring for long periods the supposedly necessary increase in the water system.

Send for our New Bulletin No. 11, "Water Waste Surveys."

THE PITOMETER CO.
52 CHURCH STREET...NEW YORK CITY



MORE WATER for OGDEN



Thirty-six wells in the gravel floor of Bingham Canyon supply water to Ogden, Utah.

A year ago, facing a constantly decreasing natural flow, the city installed the

SULLIVAN AIR LIFT

In eight wells, with two Sullivan Air Compressors, (14x10, "WG-6" Motor-driven) to run them.

When Sullivan Engineers had cleaned and practically rebuilt the wells by "back-blowing" with air, the output rose from an average of 180 G.P.M. to 500 gallons per minute. (Six-inch wells.)

And this increased flow has been maintained throughout the year.

The other 28 wells are now being fitted with Sullivan Air Lifts, operated by three more Sullivan Compressors.

Sullivan Air Lift Engineers study the well and water strata FIRST. Then fit an installation to the local conditions, which will secure the best possible results for the purchaser.

Ask for Air Lift Bulletin 371-G.

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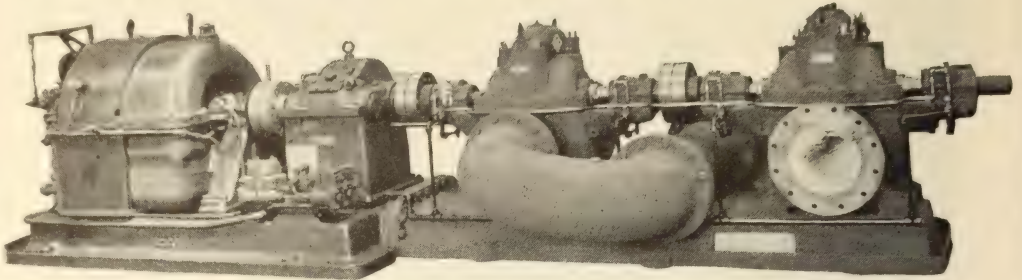
COMPRESSORS AIR LIFT DIAMOND DRILLS SHARPENERS FURNACES
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LECOURTENAY CENTRIFUGAL PUMPS



CITY OF HUNTINGTON, WEST VIRGINIA

Two 12-inch double suction volute single stage pumps coupled in series, 3,500 G.P.M. against 350-foot head, turbine-driven and supplying 5,000,000 gallons of water per day. Similar units supplied to Summit, N. J., and Cattlesburg, Ky.

FOR THE CITY OFFICIAL

Bulletin S-5—brief but comprehensive—gives you an idea of the many types and manifold uses of LECOURTENAY Centrifugal Pumps in city service. May we mail you one?

FOR THE CITY ENGINEER

Bulletin H-4 is a complete description of the testing of LECOURTENAY Centrifugal Pumps, together with much valuable data. A copy for the asking.

LECOURTENAY COMPANY

(Lea-Courtenay)

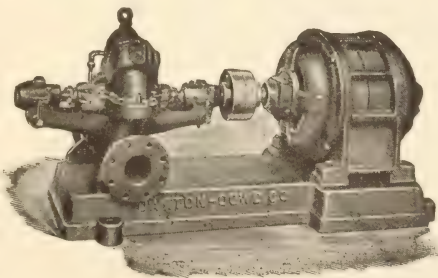
8-10 MAINE STREET,

NEWARK, N. J.

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DAYTON-DOWD CENTRIFUGAL PUMPS



You can depend on Dayton-Dowd
Centrifugal Pumps

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DAYTON-DOWD CO.

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DEAN

ELECTRIC CONTROL UNIT

FOR THE MOTOR OPERATION OF LARGE
GATE AND GLOBE VALVES

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Clean Sewers

Miller Siphons prevent sewers clogging from accumulated refuse. They regularly flush out the filth. No moving parts. Our complete descriptive text books give all details

PACIFIC FLUSH-TANK CO.

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NEW YORK CITY

4241 Ravenswood Ave.
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**CAST IRON
HOUSE DRAINAGE
FOR SANITATION**

**IN THE
BUILDING
UNDER THE
GROUND**

**USE SOIL PIPE WHERE SOIL PIPE SHOULD
BE USED**

**SOIL
WASTE
VENTS
LEADERS
DRAINS
SEWERS**

**LASTS LONGER
THAN THE BUILDING**

There can be no half-way security
cast iron soil pipe should be used for *all* house drainage
clear out to the main sewer in the street

No corrosion, no deadly sewer gas, no tearing out of walls and floors, no costly replacements—where **cast iron soil pipe** is used for soil, waste, vent and leader lines.

No pollution of cellars, no stoppage by tree roots, no danger of breakage by jar or settlement, no tearing up of cellar floors and streets, no costly replacements—where **cast iron soil pipe** is used for house drains and house sewers.

Every one interested in sanitation should have the Cast Iron Soil Pipe Specification book. Write nearest address

Krupp Foundry Co.....	Lansdale, Pa.
National Foundry Co. of N. Y., Inc.....	10 Sanford Street, Brooklyn, N. Y.
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Modern Plumbing Codes Demand CAST IRON for ALL House Drainage Piping

WARREN CAST IRON PIPE

“Quality and Service Guaranteed”



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WATER

GAS

CULVERTS

SEWERS



Special Castings

Flexible Joint Pipe

High Pressure Fire

Service Pipe

Warren Foundry and Pipe Co.

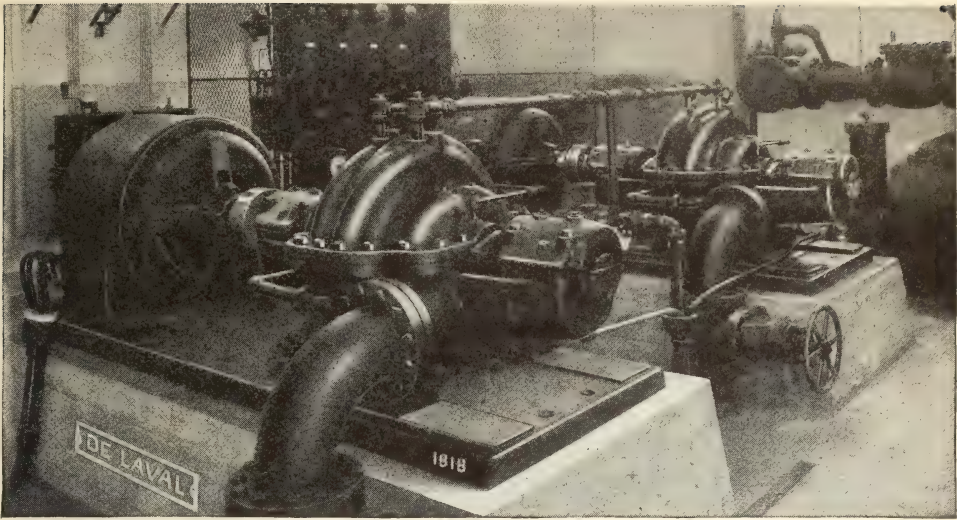
Established 1856

SALES OFFICES

11 Broadway, New York City
201 Devonshire St., Boston, Mass.

FOUNDRIES

Phillipsburg, N. J.



De Laval Motor Driven Pumps For Waterford, N. Y.

THE City of Waterford formerly used steam power to pump its water supply, but the introduction of cheap electric power has made the electric drive more economical, and four De Laval centrifugal pumps driven by induction motors were recently installed. Two of these, shown herewith, have a capacity of 1,500,000 gal. per day each against 260 ft. head. The other two supply 2,000,000 gal. per day each against 40 ft. head.

Electric drive has received close attention by our Engineering Staff, and De Laval centrifugal pumps have been developed to meet its requirements. The efficiency is exceptionally high. For example, a De Laval motor-driven pump in Minneapolis has maintained an efficiency of 86% for more than four years, without requiring replacements or repairs. Another De Laval pump at Toronto recently showed an efficiency of 87.2% in the official acceptance test. The efficiency curve is flat, so that a high average efficiency is maintained with varying rates of delivery.

The power characteristic is self-limiting, that is, the maximum demand for power occurs at the delivery corresponding to maximum efficiency, and there is no need for an oversized motor in order to provide excess power at overloads. This is favorable to low motor cost, high motor efficiency and high power factor with induction motors. The starting torque is low, so that self-starting synchronous motors can be used where it is desired to correct power factor.

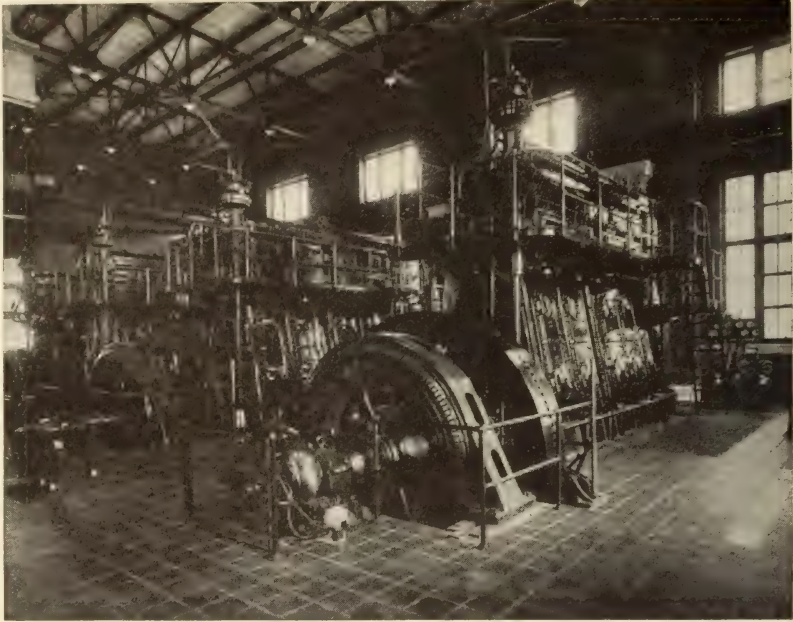
Every De Laval centrifugal pump is guaranteed as to efficiency and other characteristics, and is tested before leaving the works. Ask for Catalog B64.



DE LAVAL STEAM TURBINE CO.
TRENTON, N. J.

LOCAL OFFICES: Atlanta, Birmingham, Boston, Charlotte, Cleveland, Dallas, Denver, Duluth, Indianapolis, Kansas City, Los Angeles, Montreal, New York, New Orleans, Philadelphia, Pittsburgh, Salt Lake City, San Francisco, Seattle, Toronto.

283



When in Chicago visit this 3000 H.P. Busch-Sulzer Four Unit Plant
Sanitary District Station at 125th and Indiana Avenue.

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New York, 60 Broadway

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1700 G. P. M. from one of 4 Wells recently equipped for the
City of Rockford, Ill. Each well gave 1700 G. R. M. on test.

More
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No
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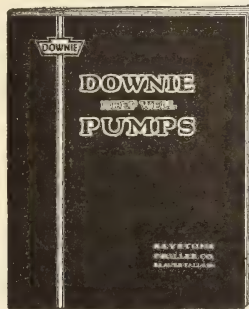
We have also equipped 5 other wells for the City of Rockford.
WHAT PUMPING PROBLEMS HAVE YOU? *Would you like our Catalog?*

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Announcing New Edition of Catalog of Downie Deep Well Pumps



HYDRAULIC Engineers, Water Works Superintendents, Well Drillers and all who have to do with problems of water supply will be interested in the publication of the new and enlarged edition of the Downie Pump Catalog. It is much more than a piece of sales literature. Besides giving a thorough and scientific discussion of the theory and practice of deep well pumping, it contains many pages of tabular data of use and value to the engineer, and rarely found in technical works.

The Catalog contains about 100 pages, fully illustrated, and will be sent upon request to any engineer or interested person.

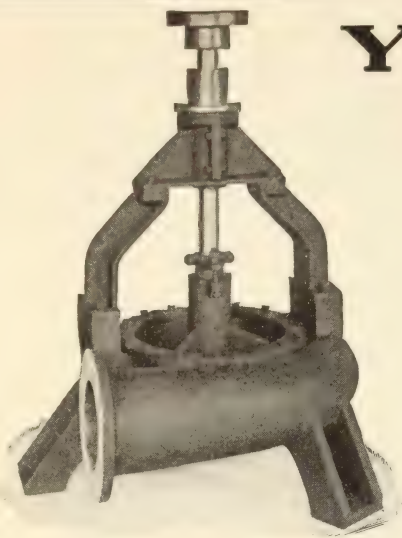
Keystone Driller Company

Manufacturers of

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Yeomans vertical centrifugal suction-type pumps driven by low-speed, direct-connected motors automatically controlled give the maximum reliability and durability for lifting the sewage of low city districts and preventing floods. The heavy casings with large water passages and perfectly balanced open impellers insure non-clogging by heavy sewage.

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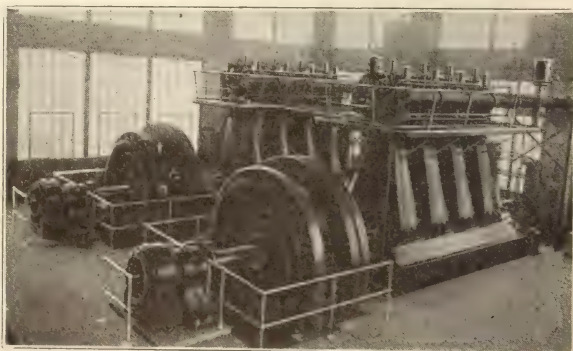
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and can always be depended upon to give their full rated output as and when required, resulting in satisfactory service with minimum layout for renewals."



MUNICIPAL PLANT WITH TWO 500 BHP UNITS

**IS THE PLANT IN YOUR CITY GIVING THE
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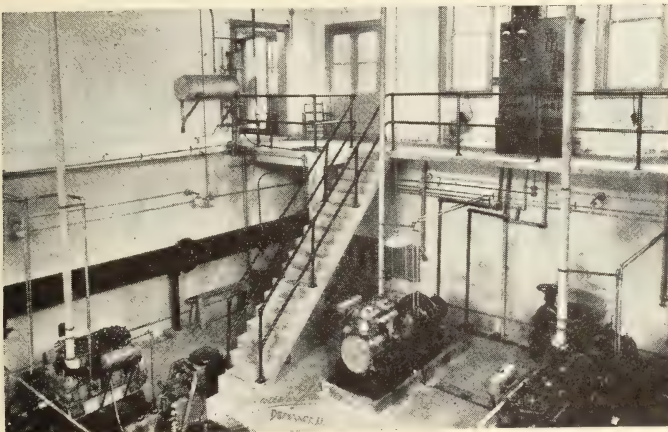
And a great majority of the most prominent consulting engineers specify for *Emergency Service*



High duty gasoline engines for centrifugal pumps and electric generator drives

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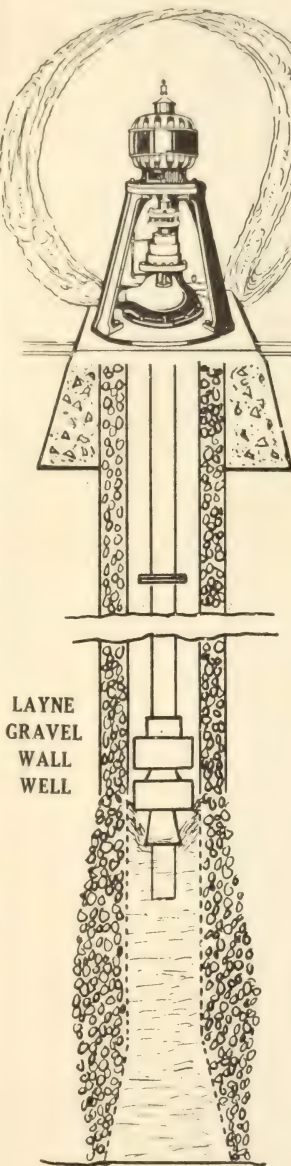


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They provide a slip-proof surface.

ECONOMY

The probabilities are that they will never need to be replaced as long as the building lasts.

The safety and the durable features result from the use of ALUNDUM aggregates containing a high percentage of Alundum abrasives.

Those familiar with the use of ALUNDUM abrasive in metal industries, in factories throughout the world, know it is a hard, tough, durable material that has been put to a harder test than any other material used in metal working. ALUNDUM grinding wheels have a reputation throughout the world. The same manufacturing experience and skill are responsible for ALUNDUM SAFETY TILE, and it is safe to assert that this floor material is practically non-wearing in contact with shoe leather.

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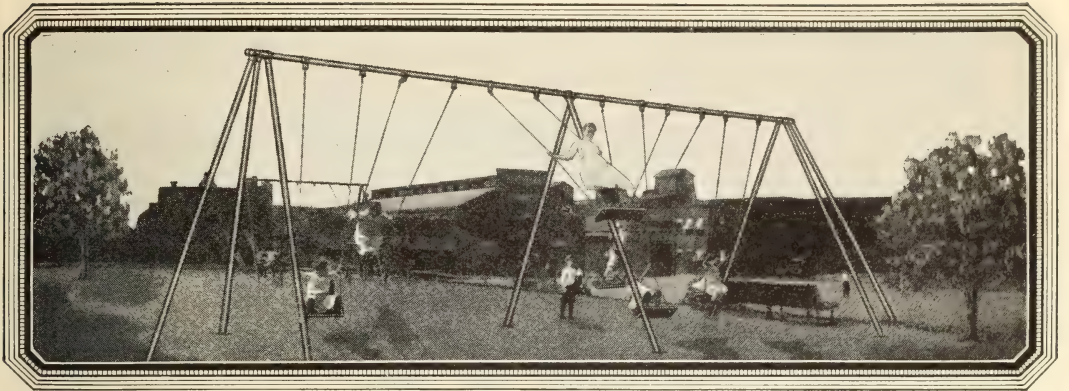
STRONG AND DURABLE

Write us for further details.

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Rubber Grips Make **MEDART** Swings Safer

In all Medart Playground Apparatus there are outstanding features resulting from many years of experience. The rubber-covered hand grip for swings is an example—it assures greatest safety and comfort. Children will use a short-link chain swing that pinches their hands, but not as enthusiastically or as often as they will use the Medart swing with its long links and vulcanized rubber grip,

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It illustrates the full line of Medart Playground Equipment. Also contains information on playground planning based on our long experience in this work. This catalogue sent free on request.

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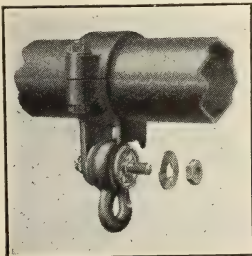
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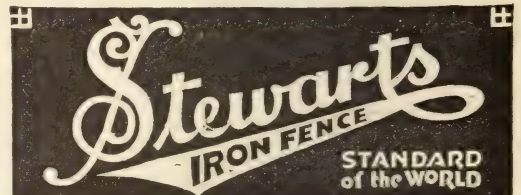
**THIS LITTLE CHAP
WILL THANK YOU**



for "OVERSIZE" Playground Apparatus. You know what we mean by Oversize — Everything made better than demanded—stronger than usually thought necessary—assuring a satisfaction greater than expected. Oversize means Safety — permanent safety. The little folks have put their trust in us, and we shall continue to justify that confidence. Good enough will not do—it must be Best. Let us work with you on your plans.

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For fifteen years, through the recognized channels for such activities, EVERWEAR has been building the character and bodies of America's Youth. It ranks highest in every element making for SAFETY, DURABILITY, SIMPLICITY, GOOD CLEAN LOOKS, PLAY POSSIBILITIES and LOW ULTIMATE COST.

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It is endorsed and specified by the leading Educators, Public Officials, Park Superintendents and Playground Supervisors in America.


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"F U N - F U L" apparatus passes all tests in that "school of hard knocks," the playground.

Every piece of "F U N - F U L" apparatus — whether it be see-saw or swing, slide or trapeze, merry-go-round or horizontal ladder—has been most carefully designed and wrought of the best iron, steel and hard-wood obtainable, so that it measures up to the highest expectations of all—

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Largest manufacturers of playground equipment in the industry. Over 21 years devoted to the manufacture of children's outdoor health-building goods exclusively.



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INDIANA



Night view of Salt Lake City's new lighting system.
This city is one of the best lighted in the world.

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The Great White Way of the West

THE ornamental lighting of Salt Lake City's streets was the result of two years' exhaustive study and experiment on the part of progressive business interests, city officials and engineers of The Utah Power and Light Co. Their aim to obtain the finest business district lighting in the country has been realized both in the fine appearance of the new system and its superior illuminative value.

The Union Metal Lamp Standards used on this job are among the largest and most handsome ever built for business district lighting. Safety, beauty, light weight and low cost of erection, were qualities so necessary on this job and ones provided only by Union Metal pressed steel construction.

You will want these same qualities whether your requirements are for large spectacular business district standards, or small modest types for parkways or private grounds.

Send for catalog of Designs S-103.

Union Metal Lamp Standard Design No. 1161, fitted with G. E. Luminous Arcs.

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GIVES GREATER SAFETY AND
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LINE WIRE
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HAZARD PARKWAY
Cables for dependable
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IF you contemplate lighting a portion of your city with gas we would like an opportunity to confer with you relative to the installation of Welsbach gas street lamps.

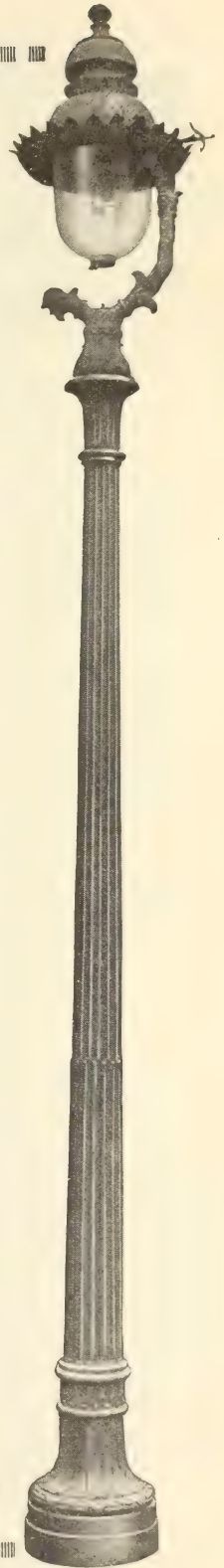
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It is far cheaper to connect our system up to your gas mains than to lay new parallel lines for other systems.

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*Glad to send you all the detailed
Information you desire*

**Welsbach Street
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*Bulletin and
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Disappearing Dome Safety Traffic Lights

ARE LIFE AND PROPERTY WORTH PROTECTING?

If they are, you will want to use the only *Safe* traffic lights

DISAPPEARING DOME SAFETY TRAFFIC LIGHTS

because in addition to performing all the functions of any traffic control device they are, by reason of their yielding dome, *absolutely safe*, as no injury to traffic itself can occur as the result of collision with them.

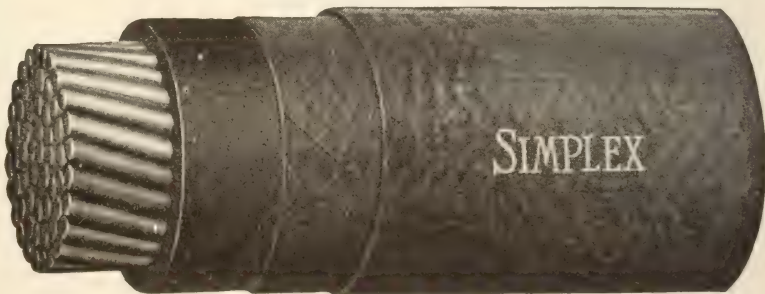
Besides, they do not clutter up the already too narrow highway with obstructions to traffic.

*Let us tell you more about this
"Safety First" traffic light.*

Safety Traffic Light Mfg. Co.
425 E. Water St., Milwaukee, Wis., U.S.A.

Rubber Covered Wires and Cables

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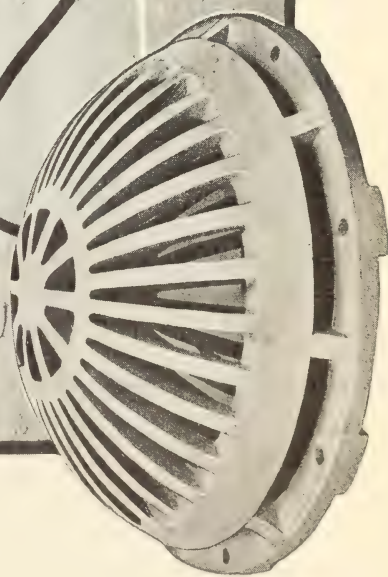
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SPECIAL ELECTRIC

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Approved and used in cities and towns everywhere. Once installed will last for many years. Special transformers obtainable for series lighting circuits.

Tests of tremendous impacts by speeding fire trucks neither damaged marker or trucks. Eliminates menace of high safety zone standards. Improved reflector. Installation simple—cost low. Ample illumination at night.

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The **MOST PRACTICAL TRAFFIC GUIDE**

The Lehman Traffic Guide is an investment in the safety of your citizens for both pedestrian and vehicular traffic. This marker cannot be damaged by the heaviest loaded truck nor can it in any way be injured by a vehicle accidentally driven over it. It is lighted at night by two bulbs which shine through ten 3½-inch ruby lenses. This traffic guide can be built to fit any size manhole, thus doing double duty as a traffic guide and a manhole cover. The Lehman Traffic Guide is thoroughly covered by patents. It stands but five inches high, is oval in design and has a hand hole in the top. It is conspicuous at night, and due to color and design is very attractive by day.

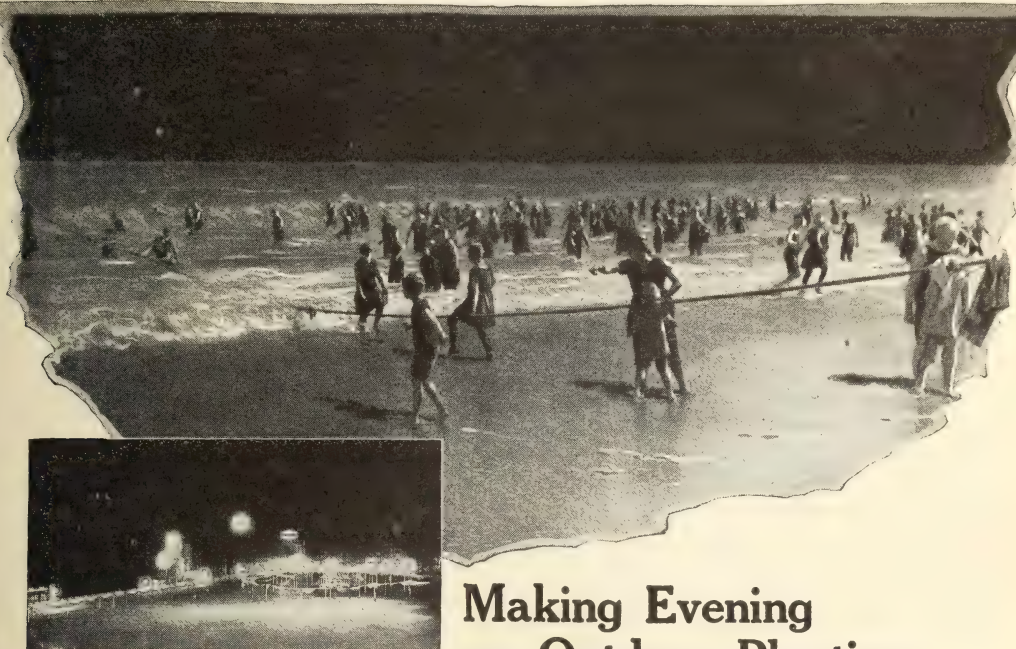


**ELKHART FOUNDRY
and MACHINE CO.**

South Elkhart Ave.

ELKHART - INDIANA

By means of proper illumination cities are making their play grounds, parks and beaches pleasure spots by night as well as day.



Making Evening an Outdoor Playtime

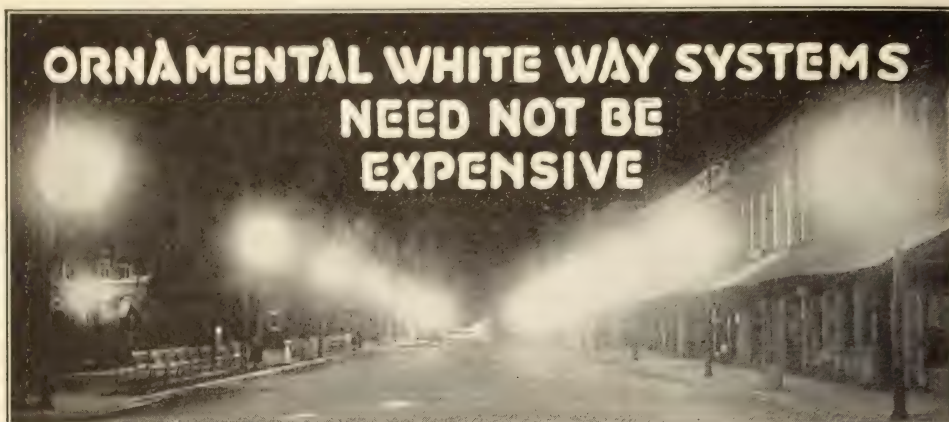
CITIES once closed their beaches and playgrounds with the setting of the sun. The worker, his day's task done, eager for relaxation, found no place in which to enjoy healthy outdoor amusement.

Today municipal councils are looking after the play needs of citizens by floodlighting their recreation places. Under the glow of G-E Floodlights beaches and parks spring into life and all classes find places for clean, outdoor recreation.

Thus floodlighting of amusement centers has received the attention of General Electric lighting specialists. Their experience will aid you in solving your problem. Call on them.

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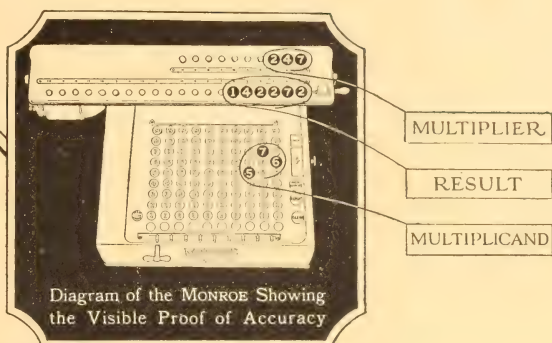
Numerous cities realize the need of an ornamental White Way system to keep them abreast of the times and convert their thoroughfares into attractive, well-illuminated streets at night. Lack of finances often prevents such installations because of the expense of the necessary equipment. The Elreco combination pole, as shown, recently installed in Bartow, Fla., solves this difficulty, as it is one complete unit, carrying the necessary overhead wires, including the lighting circuit, has an ornamental base and bracket and a General Electric Form 8 Novalux lighting unit, and permits the removal of unsightly wooden poles from the curb line.

Our latest literature tells more of the economy of Elreco combination poles

THE ELECTRIC RAILWAY EQUIPMENT CO.

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THE MONROE is "Figure Insurance". It provides a positive Proof of the accuracy of *every* calculation. For example, in multiplication the keyboard shows the amount multiplied, the multiplier appears in the upper dials and in the lower dials is the Proven Answer.

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That is why the Monroe operator is able to say: "*I know my answer is correct*".

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Special Models to fit individual requirements—British Currency Model, Fraction Models, etc., on which all ordinary calculations may also be performed.

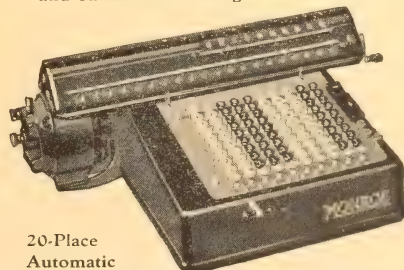
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There are Offices rendering Monroe Service at all Principal Points in the U.S and Canada and throughout the World

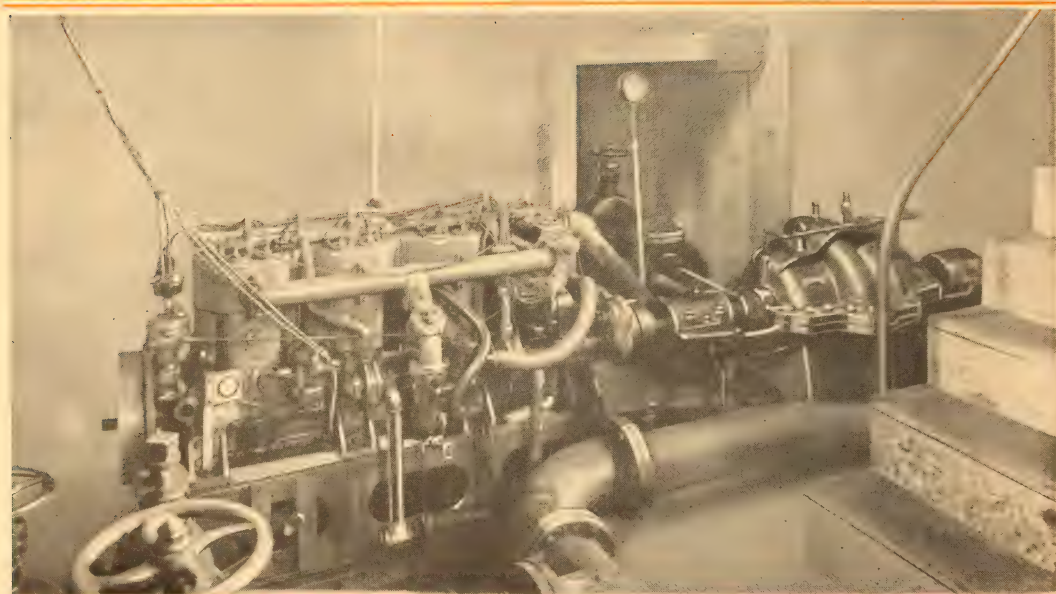
Adds
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20-Place
Automatic

Multiplies
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THE AMERICAN CITY



AMERICAN
TRADE MARK REGISTERED U.S. PAT. OFFICE



"American" Fire Pump at Eldorado, Kansas!

To the left is pictured a two stage horizontal "American" Centrifugal Pump installed by the city of Eldorado, Kansas, to be used principally for fire protection. The pump is fitted with bronze impellers and mounted upon a cast iron base, direct connected to a Van Blerck Engine through a flexible coupling. The pump was designed to deliver 1500 G. P. M. at 1400 R. P. M. against a head of 260 feet with an 8 inch discharge.

On the test run by Mr. J. H. Johnson and Mr. E. Stewart, engineers in the Department of Insurance and Inspection Bureau of the state of Kansas, the remark is made: "The average discharge of the pump was 34.7% greater than the designed capacity."

"American" Pumps are guaranteed to perform their specified service—they often do more!

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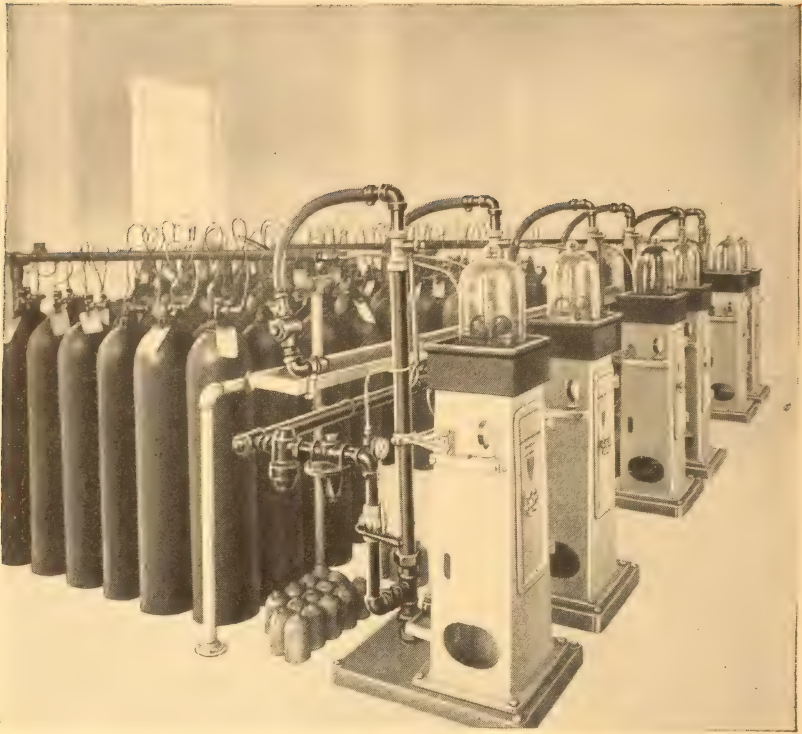
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PUMPS



THE LARGEST CHLORINATOR INSTALLATION IN THE WORLD

The Only Safe Water is a Sterilized Water



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At the Westerly sewage disposal plant of the city of Cleveland, six Type MSV chlorinators, with a combined capacity of over two tons of liquid chlorine a day, are installed to sterilize the effluent. This is the largest installation of chlorine control apparatus in the world.

It is soon to be surpassed by an installation three times as large at the Easterly sewage disposal plant in the same city.

Everywhere this new type of chlorinator has fulfilled all requirements.

The Only Safe Water is a Sterilized Water



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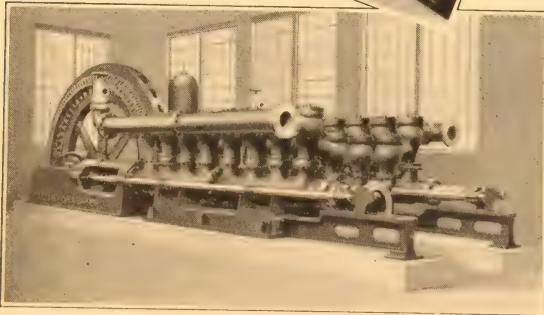
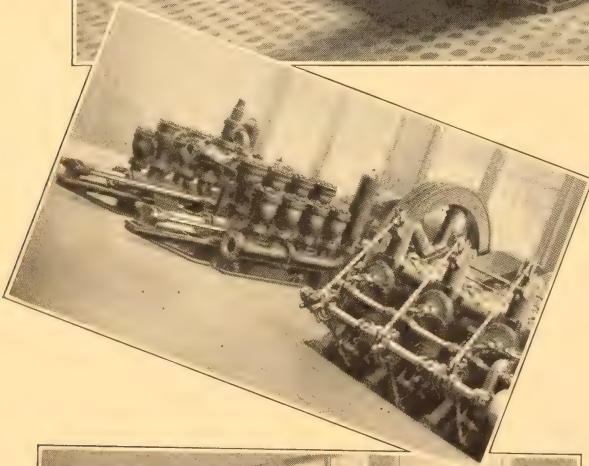
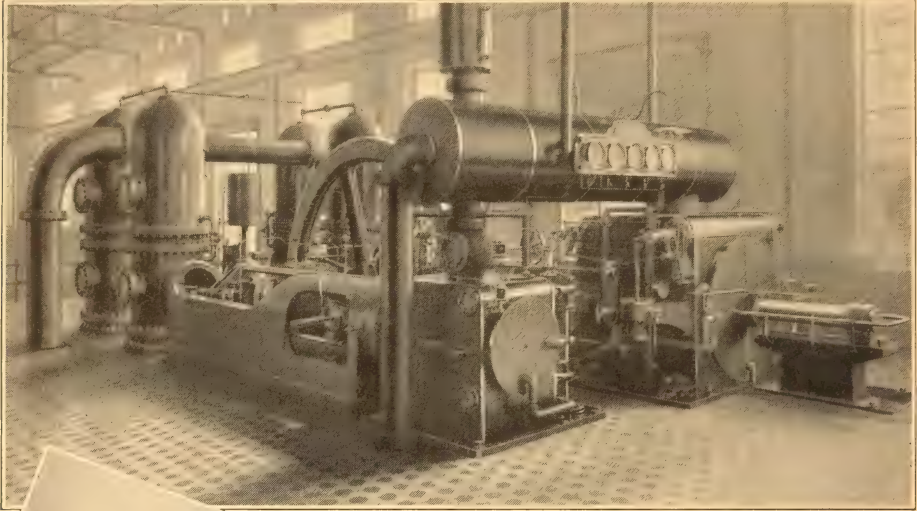
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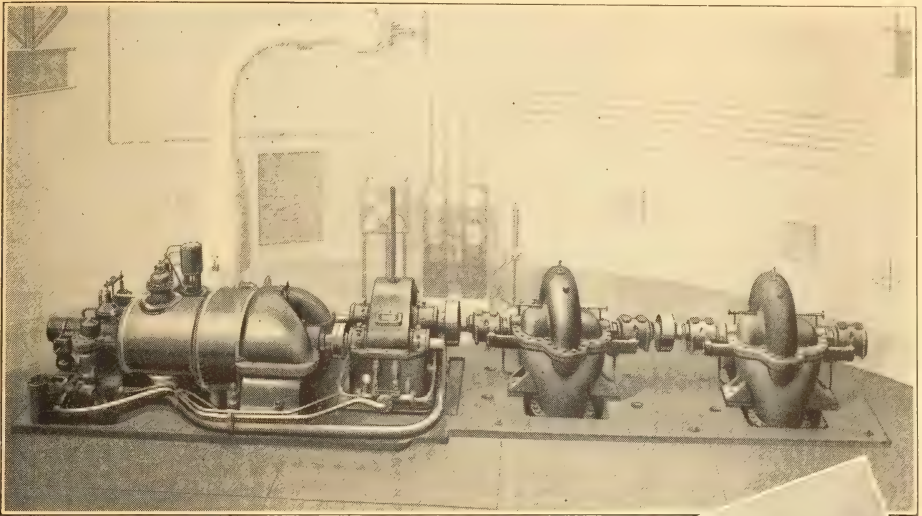
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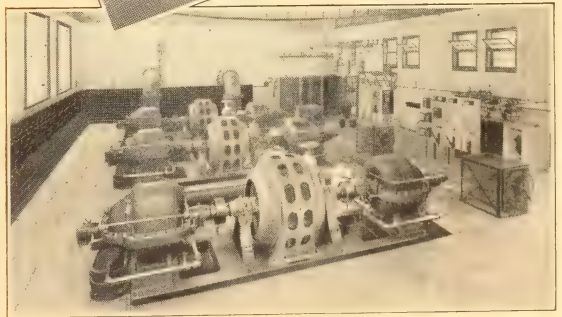
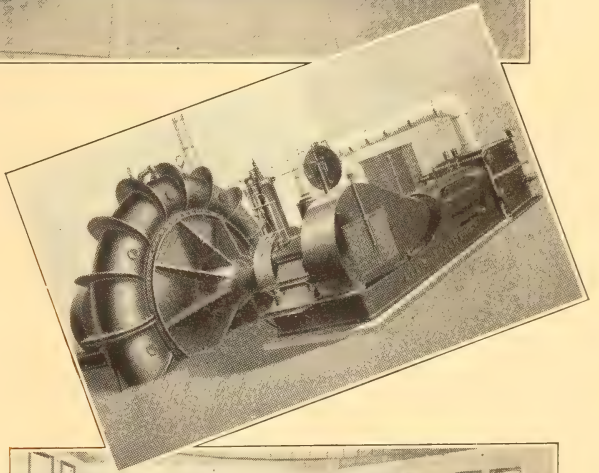
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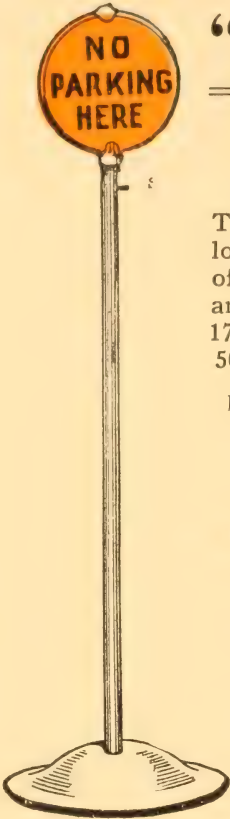
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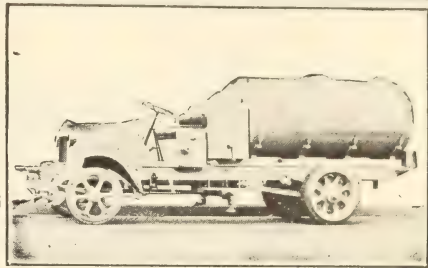
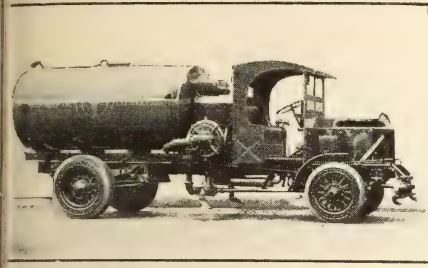
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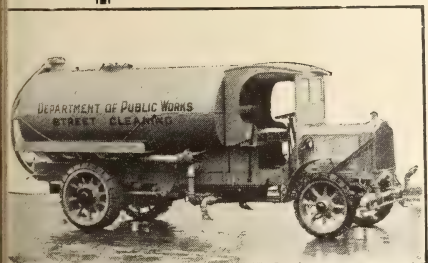
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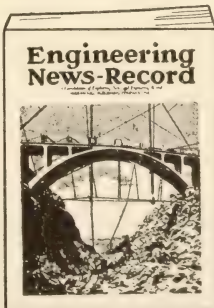
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The American City Magazine

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NEW YORK

The American City Magazine

May,

1923

Beyond the City's Limits

AJOCULAR critic of a certain city administration is credited with a recent comment to the effect that the only municipal service managed successfully in that city is the water-supply—"and that is running down hill."

Whether or not the clause quoted was figuratively as well as literally true in the particular city to which it was applied, the comment gained strength for its clever emphasis on the water-supply as municipal service of such vital significance that no city can afford to neglect it. And the problem of pure and plentiful water is for most cities not merely of local but of regional importance. Its existence is one of the causes for the recent springing up in Europe and America of official and volunteer organizations for regional planning. In England the results of one of these studies have already been published in an elaborate volume, "The Donchester Regional Planning Scheme." The area studied covers 169 square miles and embraces eight separate local authorities. "An adequate supply of drinking water," says the report, "is probably the first essential to life. This is always a difficult matter and has become within recent years acute in many of the industrial areas of England. The supply of water should be dealt with regionally."

Cooperative action in certain undertakings affecting municipalities in the environs of Boston was inaugurated thirty years ago, when there was created the first of the Metropolitan Commissions which have been serving some forty cities and towns in the development of their water-supply, their main drainage, and their park systems. No

machinery, however, has as yet been set up for the planning of more convenient means of transportation and communication between different parts of the district. To meet this need, there is now a definitely organized movement for state legislation to establish an official permanent Metropolitan Planning Board. This proposal has the able leadership of such organizations as the Boston Chamber of Commerce, the Associated Industries of Massachusetts, and the Affiliated Technical Societies of Boston, and the cooperation of some 75 mayors, boards of selectmen, planning boards, and other organizations.

A report recommending such a Metropolitan Planning Board, in substantial accord with the proposals of the Boston Chamber of Commerce, was submitted a few weeks ago to the Massachusetts Legislature by the State Department of Public Utilities. Because of a lack of coordination between the different municipalities in the metropolitan area, the report points out, extreme confusion has resulted in relation to traffic. The lack of a general plan for the laying out and improvement of the arteries of traffic not only affects railroads, railways, automobiles, other vehicular traffic, bridges, highways, and foot travelers, but also prevents the various municipalities in the area from locating property sites for fire stations, police stations, schoolhouses and other buildings in relation to arteries and instruments of traffic to be hereafter constructed.

Problems coming within the scope of this nascent art of regional planning were summarized by Nelson P. Lewis, Chief Engi-

neer for the Committee on the Plan of New York and Its Environs, in a paper before the 1923 convention of the American Society of Civil Engineers:

"To counteract the tendency to excessive concentration of population and industrial activity in certain spots; to simplify the problem of transit between different portions of the area; to bring facilities for receiving and shipping goods to all parts of the region; to establish a method of controlling the use of private property, consistently and equitably applied through the entire district, by the adoption of what might be called regional zoning; to locate places of public recreation so that they will be within easy reach of all; to relieve present congestion, which has been aptly described as 'the crowding of streets by traffic, the crowding of lots by structures, and the crowding of rooms by people.' If these results can be attained, it seems reasonable to predict that general health will be improved, a spirit of neighborliness will

be promoted, the nervous strain due to tiresome journeys to work and back under conditions often indecent will be abated, children and adults will acquire that wholesome zest coming from closer contact with nature, political dangers of revolutionary temper and mass action will be lessened, and much of the present economic waste will be avoided."

In addition to the environs of Boston and New York, metropolitan districts in America where regional planning is now being advocated by civic bodies include those of Baltimore, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Los Angeles, Minneapolis, New Haven, Norfolk, Pittsburgh, St. Louis, Springfield, Mass., and Washington, D. C. In these and doubtless many other areas the economic and social importance of regional planning is meeting with rapidly growing recognition.

New York to Celebrate Its Twenty-fifth Anniversary

MAYORS and other officials from many cities are expected to visit the exposition to be held May 28 to June 23 in celebration of the twenty-fifth anniversary of the Greater City of New York. This exposition, which is to be held at Grand Central Palace, 44th Street and Lexington Avenue, will afford an exceptional chance to study the machinery of the greatest city in America. All of the 59 departments of the city will have exhibits. There will also be lectures on a wide variety of municipal subjects, and conferences for mayors and heads of municipal departments from all sections of the country.

The chairman of Mayor John F. Hylan's Committee in charge of the celebration is Rodman Wanamaker, head of the Wanamaker stores. Grover A. Whalen, Commissioner of Plant and Structures, is his chief aid, and there

is an advisory committee which includes members of the largest commercial and banking organizations in the city.

"Taxpayers of all big cities are undoubtedly a unit in their interest as to what becomes of the money they turn into the city's coffers," said Mr. Wanamaker recently. "The coming exposition will have for one of its principal objects showing the taxpayer where his money goes and what it is used for."

On May 26 there will be a great civic and military parade on Fifth Avenue. All departments of the city administration will take part, including 2,000 firemen and 4,200 policemen. The exposition will be formally opened on May 28 by President Harding. On June 16 there will be a business men's parade which will show the progress the city has made in business methods in the last twenty-five years.

Chronology of the Governmental Research Movement

IN its Legislative Bulletin for March, 1923, the Detroit Bureau of Governmental Research publishes a list of the more important citizen organizations for securing increased efficiency in government through cooperation with officials in the various cities, counties and states. The list, rearranged in chronological order by year of organization, follows:

- 1906, New York City, Bureau of Municipal Research
- 1908, Philadelphia, Bureau of Municipal Research
- 1910, Chicago, Bureau of Public Efficiency
- 1911, Oakland, Tax Association
- 1912, Dayton, Research Association
- 1913, Minneapolis, Bureau of Municipal Research
- 1913, Ohio, Institute for Public Service
- 1914, Akron, Bureau of Municipal Research
- 1914, Milwaukee, Citizens Bureau
- 1914, Toronto, Bureau of Municipal Research

- 1915, New York City, Institute for Public Service
- 1915, Rochester, Bureau of Municipal Research
- 1915, New Jersey, Bureau of State Research
- 1915, New Mexico, Taxpayers Association
- 1916, Detroit, Bureau of Governmental Research
- 1916, California, Taxpayers Association
- 1916, United States, Institute for Governmental Research
- 1917, San Francisco, Bureau of Governmental Research
- 1918, Pennsylvania, Research Bureau
- 1919, Canada, Citizens Research Institute
- 1920, Cleveland, Municipal Research
- 1921, Des Moines, Bureau of Municipal Research
- 1921, Duluth, Taxpayers League
- 1921, Kansas City, Public Service Institute
- 1921, St. Paul, Bureau of Municipal Research
- 1922, Calgary, Citizens' Research League
- 1922, St. Louis, Bureau of Municipal Research
- 1922, New York, New York State Association
- 1923, North Dakota, Taxpayers Association

Laying Steel Pipe Water-Mains in Detroit

Congested Conditions of Street Made Special Care Necessary

DURING the last year over 55,000 feet of 36- and 48-inch steel water-mains have been laid in Detroit, Mich. While steel lines are used quite frequently in most of our Eastern cities, this is the first instance of their use in Detroit.

The laying of this pipe was accomplished in record time under trying conditions

end to end of the larger line.

To get under the Grand Trunk Railroad tracks, a siphon 45 feet in depth had to be constructed below the present street grade at Dequindre Street. To handle this work, a rectangular shaft and a circular tunnel were driven, the latter being 8½ feet inside diameter and built of four rings of brick



AUSTIN EXCAVATOR DIGGING TRENCH IN BACKGROUND; GANG PREPARING BELL-HOLES IN FOREGROUND

which are not for the most part ordinarily encountered in pipe line work. The 48-inch line, known as the St. Paul contract, was laid entirely through city streets, extending from the pumping-station through the heart of the city within one block of Grand Circus Park, ending at Sixth and Elizabeth Streets, a distance of approximately 6 miles. Included in this contract and parallel with the 48-inch steel line, a 12-inch Universal cast iron pipe line for fire and domestic services was laid from

A second siphon was located at John R. Street, being 25 feet deep and also brick-lined. In addition to these major underground crossings fifteen other brick tunnels were constructed under the Michigan Central Railroad and the Detroit Street Railway tracks.

How the Job Was Handled

Offsets to the center line of the ditch and depth of the subgrade were marked on the adjacent curbs along the streets by the

Water Board field engineers, and from these points the contractors' engineers kept the excavating machines and pipe gangs checked up as to line and grade. To meet the requirements of the city, the pipe, which is made in 30-foot sections, was stored on vacant land some distance from the line on receipt from the shop. From this point it was hauled by motor truck and trailer and strung just immediately in advance of the work. It was the city's idea to confine the work within reasonable limits and prevent undue congestion of the heavy street traffic, hence the stringing of the pipe only immediately in advance of the work. In this way much trouble and annoyance was avoided and the city's business throughout this area was left relatively unimpeded.

Gasoline-driven concrete breakers made by the Buckeye Company, Findlay, Ohio, preceded the excavating machines, breaking the pavement by successive drops of the hammer. Following the breakers, Keystone back-action shovels removed the excavation to a depth of $4\frac{1}{2}$ feet. Two

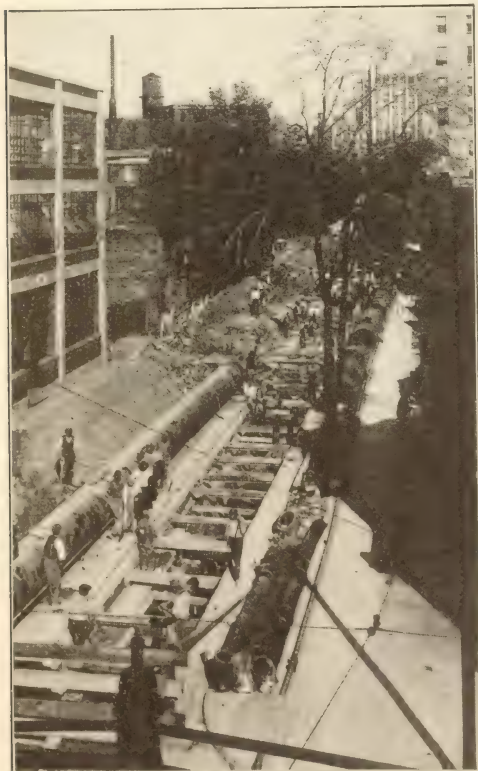
essential things were accomplished by this operation: The dirt was surplus material and not required for backfill, so was loaded immediately into 5-yard dump-trucks and carted away to the dump, inasmuch as it was necessary for the contractor to haul the material which would be displaced by the pipe line. Secondly, the shovel at a depth of $4\frac{1}{2}$ feet uncovered and exposed the various service lines for gas, water and electricity, as well as a large number of ancient water lines and modern street drains, telephone ducts and various intersecting subsurface obstructions. Three thousand services were changed during construction.

During the excavating in a very densely populated part of the older section of the city, large numbers of wood pipe lines made of tamarack were encountered in the pipe trench. These had long since fallen into disuse, but nevertheless were found in almost perfect condition. The wood sections laid in the early sixties were 6 inches thick and 8 feet long, connected with wrought iron thimbles, and were bored throughout 2 inches in diameter. The services leading from these old water lines were made of wood spools with $\frac{1}{2}$ -inch bores and $\frac{1}{2}$ -inch lead lines to the houses.

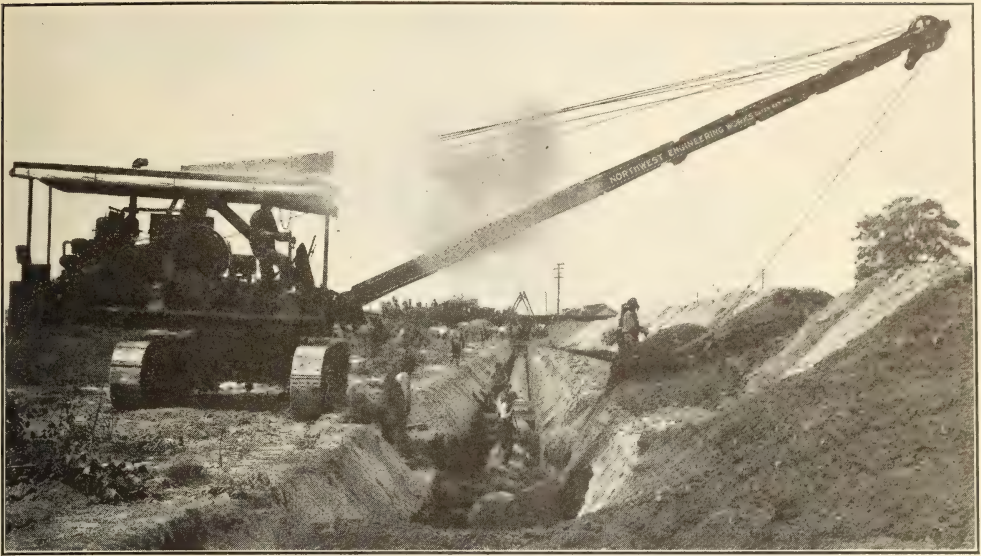
Immediately following the steam shovel service, mechanics made temporary by-passes so that the Austin trenching machine which conducted the real work of excavating would not be further interrupted or delayed. The excavated material was dumped from the buckets of the machine onto a conveyor belt and thence to the side of the ditch. The next operation was the finished grading or bottoming of the ditch, and the excavation of bell-holes at the field joints for the accommodation of the pipe gang, riveters and calkers.

Immediately following this, the pipe was laid in the ditch, as it was the practise to keep as close to the trenching machine as possible, especially when the ground was bad. In good stretches of stiff clay when bracing was unnecessary, the excavating machines were pushed to the limit and generally kept about 200 feet ahead of the pipe gang.

The pipe, having been previously strung along the line ahead of the concrete breakers and trenching machines, when reached by the pipe gang was rolled out on skids



LAYING THE 36-INCH MAIN ON ELIZABETH STREET



NORTHWEST CRANE BACKFILLING TRENCH
Gang laying pipe with tripod derricks in background

across the finished ditch. After the removal of the skids, two 18-foot tripod derricks were used to lower the pipe into the trench, and it was then connected by means of fitting-up bolts. The rivet gangs and calkers followed next in order, removing the bolts and riveting and calking up the field joints, driving something like 76,000 1-inch rivets.

Two compressor units, delivering air at 100 pounds pressure at the hammers, through a 3-inch pipe line, furnished the power for the Chicago pneumatic hammers for driving and calking. Two compressor plants were used, the first consisting of an Ingersoll-Rand compressor, and the second of a McKiernan single-stage compressor. The average length of 3-inch line supplied by each machine was about one mile.

Before the water-main was accepted by

the Board of Water Commissioners it was tested to 100 pounds hydrostatic pressure. This was accomplished through a series of fifteen tests in each of which practically 1,500 feet of pipe was bulkheaded at each end with steel dished test heads and rubber gaskets. After the tests the line was back-filled by Northwest Engineering Works skimmers and then flooded and brought to an elevation 6 inches above the street grade, the finished paving being done by the Detroit Department of Public Works.

The T. A. Gillespie Company of New York City were the contractors, employing over 600 men on this project under the direction of M. J. Coffey. The steel pipe installed was manufactured by the East Jersey Pipe Company, New York City, manufacturers of Lock Bar steel pipe.



THE NEW 350-MILLION-GALLON FILTER PLANT OF THE DETROIT WATER-WORKS
The photograph, furnished through the courtesy of Theodore A. Leisen, Chief and Consulting Engineer, shows also the filtered water reservoir at the right, and the intake at the left in the background

Traffic Interference with Street Cleaning

THE increase of automobile traffic has interfered seriously with street cleaning work. In many instances cities do not get the assistance of the police and other agencies that have the regulation of traffic at hand; thus the actual cleaning of streets is greatly retarded. In East St. Louis a motor sweeper is used for clearing the streets. The schedule has been changed several times, from day to night operation and from night to day operation, and it is about as difficult to operate at one time as another. There are garages and filling stations on nearly all street corners, and many of these places repair machines on the street.

The sweeper operator reports almost every night that automobiles are parked in the same places all night. The sweeper has to go around them, so that from 75 to 100 feet of street remains uncleaned. When the Commissioner inspects the street the next day and the machine is gone, the spot is still uncleaned and it looks bad.

In Chicago there is an ordinance preventing any parking whatsoever in certain restricted territory in the down-town section between seven and ten in the morning and between four and seven in the afternoon. Of course, that protects only a certain part of the city. During the rest of the day autos are permitted to park for 30 minutes, which means that there is a line of cars at all times, seriously interfering with street cleaning, especially in winter when snow has to be removed.

In the theater district the traffic is lined up against the curb all the time. After theater hours the cabs take the place of private vehicles.

In St. Louis, the cleaning gang starts out every night at 12 o'clock after the theaters are out and when the restaurants are nearly empty. Not much trouble is experienced after 12, as there are very few machines on

the streets. If there is a car in the way and the street cleaning gang cannot work until it is removed, it is simply pulled into the nearest block that has already been cleaned. This has helped in educating people to keep their machines out of the down-town area.

All the down-town streets are asphalt and are cleaned every night with a pick-up machine, and every two weeks they are flushed and broomed. The paved streets in the outlying districts are flushed twice a week after ten o'clock at night. The people there have also been educated, because if the machine is in the way when the flusher cleans under it and around it, the machine gets spattered with mud. The drivers know the time when the flusher is coming, so the streets are nearly all clear of cars.

In Joplin, Mo., there is an ordinance prohibiting the parking of cars in the down-town district after midnight unless someone is in charge of the car. Car owners are now educated to such an extent that when the street cleaning is started at midnight, there is nearly always somebody at hand to move the cars ahead of the gang.

When the ordinance was first made, the policemen on the beat noted the cars that were located along the curb and sought out the owners to get them to move their cars. There was some trouble, but finally the street cleaning truck was equipped with a pulling chain and pulled everything out that was in the way. To further educate car owners, the street cleaners began pulling out cars that were improperly parked, and let the owner hunt for them. Now there is excellent cooperation between the car owners and the entire street cleaning department.

ACKNOWLEDGMENT.—Prepared from the official report of the discussion of this subject at the Third Annual Conference of the International Association of Street Sanitation Officials.

The Citizens' Responsibility

Whether they like it or not, whether they know it or not, a collective responsibility rests upon citizens of the present generation for making or marring their city's future. So, whether our city of the future is physically good or physically bad is our direct responsibility.—*Herbert S. Hare.*

County Rock-Crushing Plant a Money-Saver

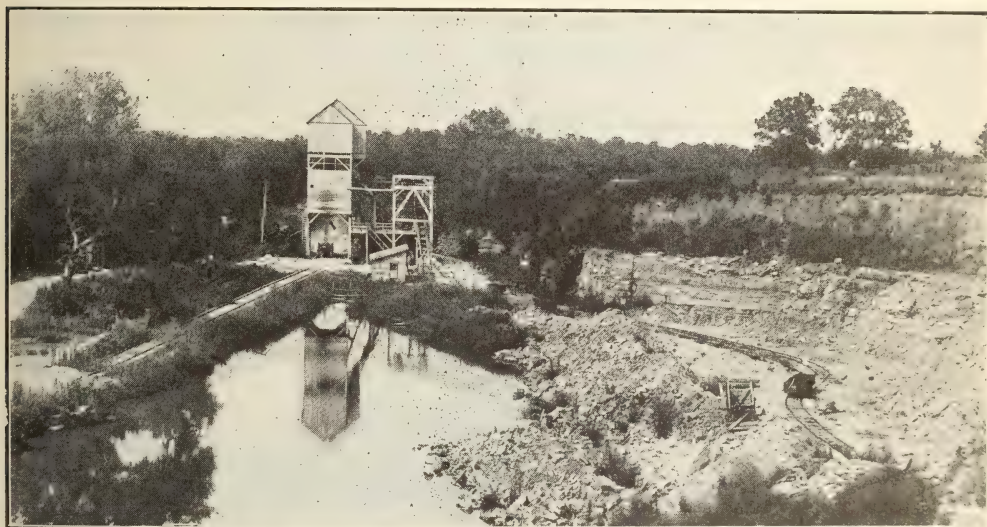
Marshall County Opens Up Rock-Crushing Plant to Supply Own Material for Road Paving

By Donald C. Elder

County Engineer, Marshall County, Iowa

AFTER the voters of Marshall County, Iowa, had put themselves on record as favoring a hard-surfacing program for the primary road system, the Board of Supervisors began to investigate the advisability of the installation of a rock-crushing plant at the quarry as a means of decreasing the cost of the pavement. After careful inspection and ex-

ated about twenty years ago, furnishing dimension building-stone. Work had been carried on some distance below water-level. Operations were discontinued at that time on account of the difficulty of getting rid of the water. The land bought does not include the old workings, but extends back from the face of the ledge. It averages about 20 feet above water-level



A VIEW OF THE STONE QUARRY LEASED BY MARSHALL COUNTY, SHOWING THE STONE-CRUSHING AND SCREENING PLANT

haustive tests, 5 acres of land, part of what is known as Rock Valley quarry, which contains a fairly high grade of limestone deposit, was purchased at \$1,000 per acre. Approximately 2 acres additional was leased as a site for the crushing plant and railroad spurs.

The quarry is located about 4 miles southeast of Marshalltown at the junction of the Lincoln Highway and the M. & St. L. Railroad. The quarry had been oper-

in the old excavation. Overlaying this ledge is some 15 or 20 feet of clay, which necessitates extensive stripping.

Two methods of stripping the clay presented themselves: first, by means of hydraulic pressure; second, by means of steam shovel. On account of several serious difficulties in the hydraulic method, and the fact that a cut of several thousand yards of excavation was necessary for the railroad spur entrance, the steam shovel

method was adopted and a Model 21 Marion steam shovel was purchased.

The crushing and auxiliary equipment was furnished by the Austin Manufacturing Company and consists of a No. 7½ and a No. 5 Austin gyratory crusher, a bucket conveyor, a revolving screen, a friction hoist, five end-dump cars, and the necessary shafting and auxiliaries.

Electricity was chosen as the motive power. A transmission line approximately 1½ miles long was erected. The 3,300-volt line from Marshalltown to Le Grand was tapped, and the 3-phase, 60-cycle A. C. current of 2,300 volts was carried to the quarry, for use in the motors. For illumination at night this current was stepped down to 110 volts.

Slip-ring induction motors of 150 and 40 h. p. were purchased, the former to drive the crushers, conveyor, screen and hoist, and the latter to drive a 10- by 10- inch Sullivan air compressor to supply air pressure for jackhammer drilling. The question of individual drive presented itself, but the increase in the number of motors required for this system would have complicated and delayed delivery, and the idea was discarded. The large motor drives a jack-shaft from which power is transmitted to the various machines through a system of belts, chains and gears.

The crushers are located in an open framed structure 34 by 42 feet in ground plan by 35 feet in height. The motor house, a "lean-to" 18 by 34 feet, abuts the crusher house. The bins are 18 by 32 feet in plan and about 48 feet in elevation, having a clearance of 21 feet 6 inches beneath, to allow engines and cars to pass. The screen house is located over the bins and is approximately 20 feet high. From the ridge-pole to the ground is about 70 feet.

It is interesting to note that practically all the timber for the plant was furnished by a native timber company, operating just across the Lincoln Highway from the quarry.

A spur, 1,200 feet long, with a passing switch of 500 feet, was run in from the M. & St. L. main line. Trackage to provide for ten loaded and ten empty cars is provided.

The stripping was accomplished by the shovel, which was at first served by teams

and wagons. This proved so unsatisfactory, however, that Koppel and Western side-dump cars were employed. These were moved by means of a home-made gasoline dinky constructed by "Bill" Johnston, the shovel runner. An old Continental motor furnished the power, which was transmitted through a friction drive. This feature was later changed to a positive gear drive.

While some of the stripping was employed to fill around the crusher plant, by far the greatest per cent was wasted into the pond formed by the former quarrying operations. A trestle work was built out at one end of the lake, and as the fill was widened, the track moved over.

Preparatory to shooting, the drilling is accomplished by means of an Armstrong Type 25 blast hole driller, which drills a hole 5 inches in diameter and 23 feet in depth. The holes are in rows and staggered so as to be about 10 feet from center line to center line. Enough holes are shot to provide a quantity of rock that can be handled nicely. At first some difficulty was encountered in shooting, because of the seamy nature of the rock, which allowed the charge to shoot out. This was avoided, however, by heavier loading.

The steam shovel is used to load the rock, as well as to strip the overburden. This operation was at first done by hand. The rocks that are too large to be accommodated by the crushers are pushed to one side by the shovel and are jackhammered for subsequent blasting. The small pieces are loaded into the rock cars, which are towed by a team to the foot of the incline leading over the crushers.

Here the hoist cable is attached to the car, which is pulled up the incline over the crushers. At the top of the incline the end gate of the car is automatically raised and the load is dumped into the No. 7½ crusher. When empty, the car is run down by gravity and another loaded one secured.

This crusher has an hourly capacity of about 125 tons of rock crushed to pass a 3½-inch ring. It discharges into a bucket conveyor, in which the rock is carried to the top of the screen house, where it is discharged into the 48-inch by 20-foot revolving screen. This screen has 8 feet of 1-inch perforation and a 5-foot 6-inch dust jacket with 5/16-inch perforations. The

graded rock passes from the screen into the proper bin, while the rejections, or rock too large to pass a $2\frac{3}{4}$ -inch ring, pass over the end of the screen into the rejection chute, and thence to the No. 5 crusher for further crushing. This crusher also discharges into the same conveyor as does the No. 7½, so that the rock is once more discharged into the screen for gradation. The graded rock is loaded in the cars for shipping by gravity through gates in the bottom of the bins. The rock, although containing some oolitic formation, is, in general, of very good quality for road-building purposes, having a French coefficient of 8 to 12.

When hard-surfacing was voted in 1919, no means were provided of furnishing the necessary finances by authorizing a bond issue at the same time. Consequently, the paving program has been on a "pay-as-you-go" basis, with 6 miles constructed to date. By the end of 1923, however, our 49 miles of primary road will be practically all to established grade, drained and bridged.

In addition to the coarse aggregate furnished for the 6 miles of 8-8-8-inch concrete pavement 18 feet wide, crushed rock has been and is at present being furnished for county bridge and culvert construction. A 7-mile surfacing project on the Glacier Trail, a secondary road, is under progress, utilizing the crushed rock passing a $1\frac{1}{4}$ -inch ring with about 50 per cent of the screenings removed. This material

is placed to the extent of 1,500 cubic yards to the mile in the same manner as is gravel. It is hoped to approximate a gravel surfacing rather than a macadam type.

The screenings—the by-product of the quarry—have several uses. With a total calcium carbonate content of between 85 and 90 per cent, they are an excellent medium for neutralizing soil acidity. They also have a possibility of being used for road repair work and perhaps surfacing on minor highways.

The working force, in addition to the superintendent, while it varies with conditions, consists in general of the shovel crew of three men, the well-drill operator, the jackhammer man, the track man, the hoist operator, the blacksmith, the oiler, two men handling the rock cars, and the water boy. Bunkhouses have been erected on the premises, in which the foremen and workmen live.

Already the rock-crushing plant has proved itself a money-saver in reducing the cost of paving to the county. It has restored to activity one of the deserted spots of the county, has made use of home materials for a home enterprise, and has established a new home industry that should furnish employment to a large number of men for several years to come, and also give the county engineer and road officials relief from anxiety as to where their road-building materials are to come from for paving their primary road system.



EAST PERRY SQUARE, ERIE, PA., LIGHTED WITH 4-AMPERE LUMINOUS ARC LAMPS ON KING STANDARDS

ALBANY, N.Y. ELECTRIFIES WATER PURIFICATION PLANT



Change Effects Economy and Ease of Operation of Entire Municipal Plant

THE city of Albany, N. Y., being dependent on the Hudson River for its water-supply, installed, some years ago, a filtration system, with steam-engine-driven pumps. Recently the system was enlarged and modified, and, after considerable investigation into comparative economy, reliability, and performance characteristics, the steam engine drive for the pumps was replaced with electric motor drive. Improvements were also made in the filter system, the new system being put into operation early last summer.

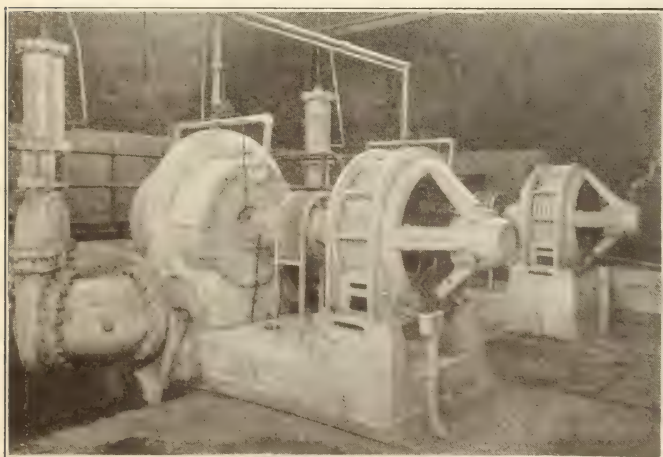
Under normal conditions the present plant supplies the city reservoirs with about 18,500,000 gallons of filtered water a day, making care of a per capita consumption in the city of 145 gallons a day. The effective-

ness of the system is such that the reservoir water is 99 per cent pure; the death rate from water-borne diseases in the city has fallen from 85 to 2 per 100,000 of population per year. This is especially remarkable, considering the fact that the Hudson above Albany is contaminated by the sewage of many cities, both on its banks, and on those of the Mohawk, which empties into it farther up.

The equipment of the plant consists of two filter systems, and eight Worthington pumps of various capacities driven by General Electric induction motors, with, in most cases, individual drum control. Power to operate the electrical equipment is delivered to an outdoor transformer substation at 13,200 volts, 3 phase, 40 cycles,

where it is stepped down to 440 volts and distributed through a main switchboard which carries the primary control for all the motors except the raw water pump motors. This switchboard also carries the control switches for the house lighting circuits. Some of the pumps are used to circulate the water through the filter system, and some to supply wash water to the filters.

Unfiltered water is admitted directly from the river into an open well, whence it is pumped into the sedimentation basin

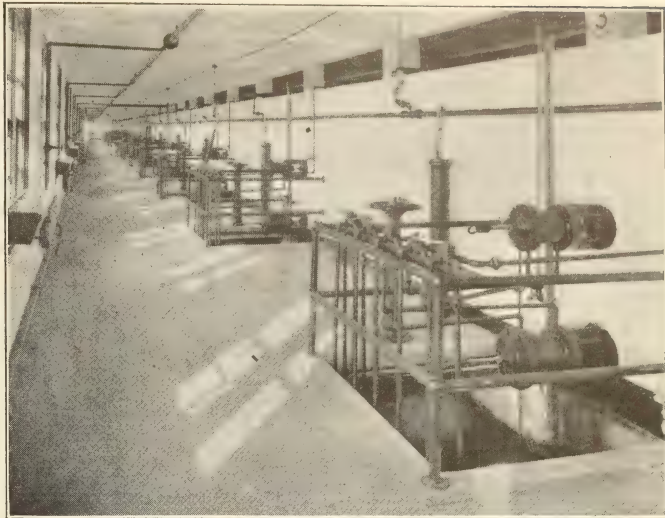


RAW-WATER PUMP, ALBANY, N. Y., FILTRATION PLANT, PUMP-
ING FROM AN OPEN WELL TO THE SEDIMENTATION BASIN

through a 36-inch discharge main at a maximum discharge rate of 17,000 gallons, and a minimum rate of 12,000 gallons per minute. This duty is performed by two duplicate pumping units, each driven by a direct-connected 150-h.p., varying-speed, slip-ring induction motor. The motor speed is controlled by drum controllers mounted in the same room, the primary control being mounted on the same supports. One of the units is operated continuously night and day, pumping at an average rate of 14,000 gallons per minute

against a total head of about 19.6 feet. This rate and head vary, however, according to water conditions in the river; hence the necessity for varying-speed control on the motors. During high water the pumps supply 12,000 g.p.m. against a head of about 15 feet, and during low water, they supply 17,000 g.p.m. against a head of about 24 feet.

From the sedimentation basin, the water, after some of the heavier impurities have been allowed to settle out, is pumped to the preliminary filters, also known as the rapid sand filters. These are sixteen in number, located in a long building adjoining the pump room. There are two pump units, one operating continuously, and each capable of delivering water at from 12,000 to 17,000 gallons per minute to the filters, against heads varying from 8.7 to 9.0 feet. The water-level in the filter units is maintained at 81 inches, as shown by two gages mounted in front of the filter near the control handle, the depth of the sand being about 40 inches. Periodically the filters are drained and washed, the latter being accom-



CONTROL GALLERY FOR PRELIMINARY OR RAPID SAND FILTERS, ALBANY, N. Y., FILTRATION PLANT

plished by forcing water up through the sand, from underneath, and allowing it to drain out again. The pumping units for supplying water to be filtered, and that used in washing the water, are located in the adjoining room. The former are driven by 60-h.p., 343-r.p.m. varying-speed, slip-ring induction motors, and the latter by 250-h.p. motors of the same type, which pump at a uniform rate of 12,000 g.p.m. against a total head of 56 feet.

From the preliminary filters, the filtered water flows by gravity to the second set, known as the slow sand filters. These are located out of doors, covering an area of about 0.7 of an acre. The water coming from these filters is analyzed and, if necessary, is given a chemical treatment, to insure its conformity to the purity standard. Leaving the filter plant, the water flows some distance to the pumping-station, where it is pumped to the reservoirs. The slow sand filters are washed in much the same way as the preliminary filters. The wash water is supplied by pumps located in the main building, at 1,000 gallons per minute.

The Importance of the Water-Supply

When we stop to reflect upon the life of the community, it seems to me that we must admit that the water-supply is of fundamental importance. There is no other service of a public nature which is so extremely important to the life of a community as the water-supply. Moreover, there is no other service which is so cheap, even at present-day rates, as the water-supply.—LEONARD METCALF.

Maintaining 268 Motor Trucks and Cars in Newark, N. J.

A Statement of How the Vehicles Are Used and Distributed

IN 1922, the city of Newark, N. J., paid \$134,338.90 for the maintenance of its 268 pieces of motor equipment. This charge includes gasoline, oil, tires, repairs, and salaries of the men in the city repair shop who took care of the \$700,000 worth of passenger cars, motor trucks, fire-fighting apparatus, police patrols and motor-cycles. Nearly 50 per cent of the equipment is owned by the Department of Streets and Public Improvements, and approximately one-half the maintenance is chargeable to that department.

four 6½-ton flushers, one 6½-ton Auto Eductor, one 5-ton electric truck, one street sweeper, and twelve 1-ton and 2-ton trucks. Six of the 5- and 6-ton trucks and the three tractors belonging to the Department are equipped with snow-plows. During the last year, two of these plows were constructed in the Department shops, near the City Hall.

Care of the Cars

The Department of Streets and Public Improvements cares for the cars of other

STATISTICS OF NEWARK, N. J., CITY MOTOR VEHICLES

Department	DISTRIBUTION OF MACHINES							Motor-Cycles
	Limousines	Sedans	Coupés	Touring	Roadsters	Trucks	Tractors	
Streets and public improvements.....	1	10	4	19	19	37	3	3
Public affairs	1	2	..	5	..	2	..	2
Parks and public property.....	1	..	..	2	1	..	..	..
Revenue and finance.....	1	..	..	..	..	..	..	..
Public safety	1	..	..	..	..	..	..	..
Building .....	..	..	..	2	1	..	..	..
Electrical inspection .....	..	..	..	2	..	..	..	..
Fire .....	..	..	..	..	11	40	16	..
Police .....	..	..	..	17	2	10	..	42
Board of education .....	..	2	1	..	..	8	..	..
	5	14	5	47	34	97	19	47
Total number of vehicles.....								268

	COST OF MOTOR EQUIPMENT		
	Trucks	Passenger Cars	Motor-Cycles
Streets and public improvements.....	\$151,088.50	\$72,662.90	\$493.50
Public affairs	30,241.65	12,513.50	960.00
Parks and public property .....	..	8,114.93	..
Revenue and finance.....	..	5,808.45	..
Public safety—			
Fire department	361,993.32	15,543.76	..
Police department	20,256.50	23,117.75	..
Building department .....	..	..	..
Electrical .....	..	4,383.92	..
Totals	\$563,585.17	\$142,145.21	\$1,453.50
Grand total	\$707,183.83		

The city owns 5 limousines, used by the directors of the various departments, 14 sedans, 5 coupés, 47 touring cars and 32 roadsters, in addition to 87 trucks, 19 tractors and 47 motor-cycles. Of the trucks, 30 belong to the Fire Department, and 9 form the chassis for the patrol wagons of the Police Department. Two of the chassis are used as busses by the Board of Education for transporting crippled children.

Among the 37 trucks which the city records show belong to the Department of Streets and Public Improvements, valued at \$151,083.50, are six 5-ton dump trucks,

departments, whenever its mechanics are available. Last year ten cars from other departments were given supplies and in some cases were repaired by the Department mechanics, the cost, together with a small addition to meet overhead expenses, being charged to the department to which each car belonged. The Department started the year with a capital of \$10,000, finished the year with its capital intact and showed a profit of \$1,200 to the city. Both capital and profit were turned back to the City Treasurer.

The garage costs for the year 1922 were



A FEW OF THE TYPES OF MOTOR VEHICLES AND APPARATUS USED BY THE CITY OF NEWARK, N. J.

1. Elgin auto sweeper for street cleaning. 2. An Auto Eductor for cleaning catch-basins. 3. Type of Police van and motor-cycle used in Newark. 4. Type of bus used for transportation of crippled children to and from school. 5. Five-ton dump-truck equipped with "Newark tailgates." This gate was designed and built by mechanics of the Department of Streets. 6. Aerial fire truck, partly raised. 7. Motor pumper with a capacity of 10,000 gallons per minute

\$23,727.41 for gasoline, \$2,452.92 for oil, \$8,540.68 for tires, \$13,385.10 for payroll, and \$13,865 for materials.

Use of Cars by Departments

The maintenance of the passenger cars of the Department of Streets and Public Improvements cost the city \$72,662.90, and two motor-cycles cost \$493.50. All of these are used by employees in the work of the Department and are kept at the garage, where a system of checking in and out is maintained. Each car user signs for his car when it is taken out and returned.

One lone car, a limousine, constitutes the motor equipment of the Department of Revenue and Finance. In addition to being used by the Director of Revenue and Finance, the car carries the funds of the department to the 17 banks and trust companies in which deposits are made. The insurance carried by the Department specifies that the insurance company will be responsible for loss of money only when carried in this particular car. The car is also used by members of the City Tax Board and for carrying County Tax Board members when inspections of city property are made by that body. The hiring of outside cars for the use of the taxing body or for others in the Directors' Department is absolutely forbidden, and the sole automobile expense of the Department is centered in this car.

A charge of \$9,632.30 was incurred by the Mayor's Department, which includes the Health Department, the City Hospital and the Almshouse. The Mayor has one car for his exclusive use. In the Health Department one car is used by the Executive Division, one by the Food and Drug Division, and a motor-cycle by the Laboratory Division. A motor-cycle is also used in the Sanitary Division and, inasmuch as no car is owned by the Department for the Veterinary Division, the head of that department is allowed \$720 a year for the use of his car. A truck, two touring cars and a suburban body light car are listed for the Almshouse; four ambulances and the car used by the Mayor are maintained at the City Hospital garage. The four ambulances made 4,740 calls during the year.

The Department of Parks and Public Properties has no garage of its own and hires outside quarters for its four cars.

Only one of these is used by the Director; two are used by the Division of Weights and one by the Shade Tree Division.

In the Fire Division of the Department of Public Safety, there are 67 motor vehicles of various kinds, the total cost of up-keep for 1922 being \$27,814.79. Ten roadsters are used by the Chief, Deputy Chiefs and Battalion Chiefs, and the repair shop where the overhauling and repairing of the equipment is carried on. Sixteen tractors are used to pull hook and ladder trucks, steam fire engines and a water-tower. A runabout is used by the telegraph system employees, and two trucks are employed for hauling purposes, one being a combination wrecker. The rest of the equipment is made up of 23 combination pumping chemical and hose cars, 4 combination chemical and hose cars, 4 aerial hook and ladder trucks each carrying 75-foot ladders, and 5 chassis for combination chemical and hose wagons. The 16 tractors are divided, 7 to steam fire engines, 8 to hook and ladder trucks and 1 to a water-tower.

The up-keep of the 28 automobiles in use by the Police Department, over half of which are used on patrol duty, was \$15,406.83, which includes supplies, oil and gas, repairs and extra equipment. The 42 motor-cycles all used exclusively for police duty, cost \$5,325.76 for maintenance, gas, oil and equipment. Of the cars not used in patrol work, 4 are used by the department heads, the Chief and Deputy Chief each having a runabout and a touring car. One car is used by the Board of Public Safety. The others are used for various department affairs, such as emergency patrol and repairs.

The Building Department, also under the Safety Department, has two cars for the 10 inspectors. In the Electrical Inspection Division, which is under the Department of Safety, 4 of the 7 inspectors alternate in the use of 2 of the 3 cars in the Department in their inspection work. The third car is used by the Superintendent for extra inspections, appointments and trouble work. This car is frequently used during the morning by one of the inspectors. All the cars were purchased three years ago, and consequently the up-keep is increasing rapidly.

The cars in use by the Board of Education include a 7-passenger sedan for the use of the Board, a light sedan and 4 trucks

for the Business Manager's Department, a coupé and 2 trucks in the Department of Supplies, and 2 auto busses for the transportation of crippled children to and from school.

Length of Service

Most of the cars in use by the city government were purchased in the last three years, although 7 purchased in 1914 are still in use. It is the policy of the various departments when new cars are necessary, to trade in the old car and allow

its value to be credited against the new purchase. By years since 1914, the purchases have been as follows: in 1916, 1 car; 1917, 2 cars; 1918, 8 cars; 1919, 21 cars; 1920, 42 cars; 1921, 31 cars; 1922, 35 cars.

One ambulance was purchased in each of the years 1919, 1920, 1921 and 1922. It is expected that a fifth will be purchased this year, so that the use of police patrol motor vehicles will be eliminated in carrying persons that have been injured to the City Hospital.

What Municipal Forests Should Be in the United States

FOR over 1,000 years, the Sihlwald Forest in Switzerland has been supplying the city of Zurich with wood. This is the result of orderly and intelligent forest management, and it simply means that hundreds of years ago the people of Zurich had learned one thing that we do not seem to appreciate, namely, that we cannot cut our forests off and still have an adequate lumber supply.

The *American Bulletin* states that there are places in Minnesota and Wisconsin, citing two instances, where one can travel for miles through ghastly stumpage land which was cut over twenty or thirty years ago, and which, if reasonable provision had been made for natural reseeding, and if the slashings of logged-off trees had not been left lying around to start brush fires and to kill off the few seedlings that did manage to get a start, would to-day support a second growth of timber almost ready to sell. Much of this logged-off land is suitable for little else than forest growth. The top soil is shallow and rocky and there are thousands of acres which have grown nothing of any value since the trees were cut off.

The truth is, we Americans have behaved with our natural resources much like a flock of children released with carte

blanche in a candy shop. In less than fifty years we have swept away forests which cannot be replaced even to a small degree inside of several generations, and so far most of the efforts made to repair some of the damage have been ineffective.

It is ineffectual to pick flaws in any system—or lack of system; the effective thing to do is to point out a remedy. Inasmuch as we in America are supposed to react to slogans, why not adopt the slogan, "Remember the Sihlwald"? Remember that since the days of King Ludwig in the year 853, the Sihlwald has been producing timber and that, since 1460 at least, there has been an orderly supervision of cutting and replanting. To-day this forest supports a small, yet thriving, woodworking industry. A small mill is operated and lumber, railroad ties, tool handles, stakes and poles are turned out in respectable quantities, not to speak of a considerable production of excelsior.

Clear-minded, far-sighted municipal officials in the United States should begin to "Remember the Sihlwald" and the principle exemplified by its thousand-year production record. If they will only consider this seriously, we may look for something practical and effective in the way of forest regulation and production.

Plan to Plant Another Tree

This is the title of the Official Bulletin of the Tree Savers Association of America, Volume I, Number 1 of which has just been issued. Address the Secretary of the Association, J. A. Young, 53 South La Salle Street, Aurora, Ill.

Forward Steps in Municipal Affairs

An Improved Safety Zone

DETROIT, MICH.—A new type of safety zone, and one which is believed to be an improvement in many ways over those previously used, has just been constructed in Detroit. It consists of a row of very heavy wrought iron posts, 6 inches in diameter, set into the pavement. These posts stand about $3\frac{1}{2}$ feet above the pavement, and are set 8 feet apart.

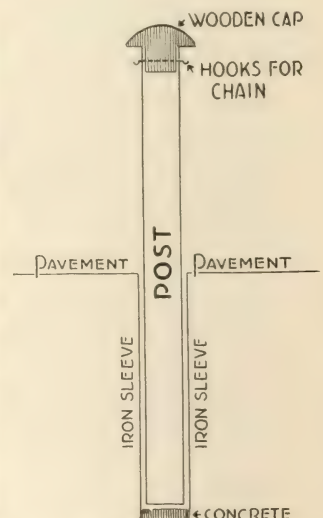
The zone is 5 feet wide by 88 feet long, which is the full length of the space where the street cars, including the trailers, receive and discharge passengers. To prevent autos from running through the safety zone a post is set close to the car track, and to eliminate any danger of accidents caused by autos running into the posts, a bright green light burns on a tall post at the end of the safety zone. The post which carries this light is offset from the line of posts forming the safety zone, so that in case any one should strike the end post with some vehicle heavy enough to bend or break it, the lamp-post would probably escape injury.

A great many vital accidents have occurred in the past because autos dashed through safety zones marked off with paint on the pavements. The raised concrete safety zones have been found very efficient, but the cost is so great as practically to prohibit them except at the most important corners. It is thought that the new type affords as much protection as the concrete, if not more, and the cost is only a small fraction of the cost of the concrete. The cost of a concrete safety zone of similar size is about \$1,600, while the new type costs slightly less than \$400.

The posts were set in the following manner: After the pavement was cut through, holes were bored to a depth of slightly more than 3 feet, and a little concrete was poured into the hole; then an iron sleeve 3 feet long and 7 inches in diameter was dropped into it, and more concrete was poured all around outside of this sleeve. The posts, which are 6 inches in diameter, drop into this outer sleeve, thus being removable at any time, as they are not cemented or otherwise fastened in any way. These wrought



NEW SAFETY ZONE AT WOODWARD AVE. AND GRAND CIRCUS PARK, DETROIT



HOW THE SAFETY ZONE STANDARD IS BUILT

iron, hollow posts are 6 feet long, which makes them extend 3 feet above the pavement, but each is capped with a wooden plug, rounded, which gives the posts a more finished appearance and also serves to keep water from getting into them. A bolt extends through the post and through the plug, holding the plug in position and also providing a hook on each side of the post upon which to fasten the $\frac{1}{2}$ -inch wrought iron chain which connects them. This plug adds nearly 6 inches to the height of the post.

The skip-stop method is used with the street cars in Detroit, and there is always the possibility that it may be necessary for some reason to change the location of the stop. This would cause a great deal of expense if the concrete platforms were in use, for the cost of removing one of these is nearly as great as that of building it. With the new type, however, it is a simple and inexpensive matter to change the location. The lamp-post is bolted to the pavement, but the wiring is attached only by means of a slip connection beneath the base, so it, too, can easily be moved. It is estimated that the whole safety zone could be entirely removed in about one hour. Thus it could be removed to clear the way for parades or to facilitate the movement of fire-fighting apparatus in case of a large conflagration.

The time of six men for two days was required to build this zone, which was designed by the Department of Public Works. It is the first of its kind in Detroit, and so far as is known there are no similar installations in any other city.

JOSEPH A. MARTIN,
Commissioner of Public Works.

A Vehicle Pound for Traffic Violators

GRAND RAPIDS, MICH.—What is known as a Vehicle Impounding Ordinance is in effect in Grand Rapids. Its object is to provide a means of enabling the minor traffic violators to pay a fee in lieu of being ordered into the police court, and without loss of time incident to court proceedings.

The ordinance provides that there shall be a vehicle pound designated and an officer or officers to operate it. Vehicles parked in violation of the ordinance may be removed to the pound, or the officer witnessing the violation may post or attach a notice to the

vehicle, charging the driver to pay to the officer in charge of the pound the same fee as though the vehicle had been impounded. If he fails within forty-eight hours, complaint is made in the police court charging him with violation of the ordinance.

The penalty for the first offence is \$1; second offence, \$3; third offence, \$5, and thereafter at the same rate until January 1 of each year, when a new start is made.

This ordinance has been in effect since January 11, and is proving very satisfactory.

FRED H. LOCKE,
City Manager.

Collecting Cemetery Maintenance Assessments

FRANKLIN, VA.—In Franklin no tax for cemetery maintenance is allowed by the state. We have tried for years to collect an assessment from the owners of cemetery lots. Some pay—some refuse—and some have moved away, address unknown. Our old Poplar Spring Cemetery sold lots cheap without provision for up-keep. In an effort to force payment, we have adopted an amendment to the cemetery ordinance containing the following provisions:

All owners of lots in Poplar Spring Cemetery shall have the same cleaned of all weeds and high grass at least once during each month from April 1 to December 1, of each year.

All such owners failing to comply with this ordinance, after ten days' notice from the keeper of the cemetery, either personally, or by mail, or by notice in a newspaper published in the town of Franklin, shall be subject to a fine of \$5, and in addition thereto the keeper may cause such lots to be cleaned at a cost not exceeding 50 cents for half-lots and \$1 for whole lots for each time, which amount shall be charged against the owner of said lot, to be paid as a fee to the town of Franklin before any burial permit shall be granted for any interment in said lot. Provided, however, that this section will not apply to any owner of a lot who has paid the annual assessment of \$3.50 for half-lots and \$6 for whole lots for cemetery maintenance purposes, or has paid to the maintenance fund the amount of \$60 for half-lots or \$100 for whole lots, to be placed in a special town account and the earnings of which fund shall be used for perpetual up-keep of such lots.

Does any reader of THE AMERICAN CITY know of a better way to meet this problem of cemetery maintenance?

H. L. BEACH,
Town Manager.

Traffic Lights and Zone Markers in Richmond

RICHMOND, VA.—“Mushroom” traffic lights have been found quite effective in Richmond in regulating traffic at congested corners where, on account of our limited police force, we are unable to place traffic officers. The lights have materially lessened the number of accidents and have eliminated the bad habit automobile drivers have of cutting corners, the signal directing them to make the proper turn around the center of the street intersection. The “mushroom” is visible both day and night, is not unsightly, and if accidentally hit, is not easily damaged.

In addition to the mushroom traffic lights, we are using a number of mushroom zone markers. These are of the same type of construction as the traffic light, but are smaller in size and cost less to procure and install. We are using the latter where streets come to a dead end and at exceptionally dangerous street intersections where we require traffic to come to

a full stop before crossing or entering the intersecting street. In such cases we use two of the zone markers, placed in the center of the street, one on each side of the intersecting street on a line with the intersecting property line. The word “Stop” is



INTERSECTION OF GRACE AND ALLISON STREETS, RICHMOND, VA., WHERE, BY THE USE OF THE ZONE MARKER AND THE “FULL STOP” REGULATION, ACCIDENTS OF SEVERAL A DAY HAVE BEEN REDUCED TO PRACTICALLY NONE

Painted on the roadway in front of each of the lights and may be easily read by drivers of vehicles moving in either direction, day or night. The street light illuminates the sign at night, and the red light from the zone marker calls attention to it.

WILLIAM M. MYERS,
Director of Public Safety.



BY THE “FULL STOP” REGULATION AND THE TRAFFIC LIGHT PLACED AT THE INTERSECTION OF GRACE AND BELVIDERE STREETS, WHERE BUS AND JITNEY LINES MAKE TURNS, THE DANGER OF ACCIDENT IS GREATLY REDUCED

THE DETROIT DEPARTMENT OF STREET RAILWAYS

A series of seven bulletins entitled, “What Was and What Is on the Street Railway System,” has been prepared by Walter Jackson, consultant, showing the condition of the Detroit street railways property when taken over from the Detroit United Railways, and the condition of the property to-day under city ownership; comparing the municipal standards with those of the American electric railway industry at large, and making suggestions for future improvement. Apply to the Department of Street Railways, Detroit, Mich.

Chicago's New Manhole Cover

Designed by a Member of the Bureau of Sewers, It Has a Reversible Curb Which Can Be Changed Without Damage to Pavement

A NEW manhole cover in three pieces—base, ring or curb, and lift—has recently been designed in which the curb can be reversed without tearing up the adjacent pavement after the ledge supporting the lid has been appreciably worn. The new manhole covering is the result of a hunt for a lighter design and a stronger one than the old standard one used for more than twenty-five years by the Chicago Sewer Department.

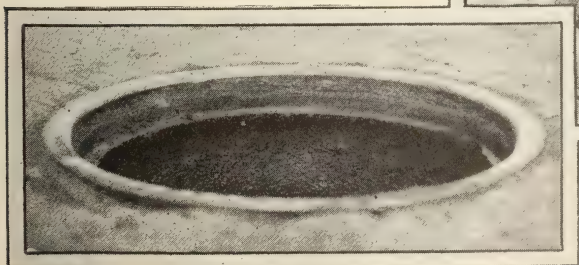
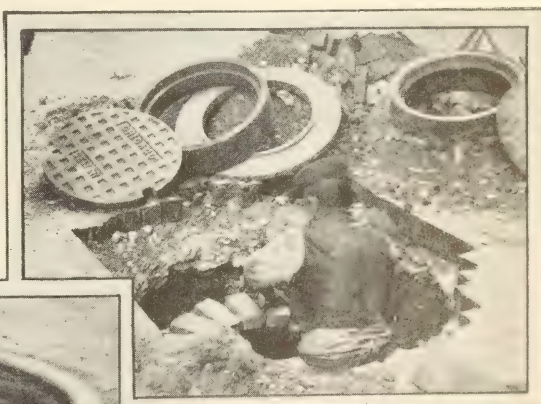
The new cover is about 90 pounds lighter than the standard design which it replaces. The cost of restoring the pavement in replacing worn-out two-piece covers has been very high, since for a minimum pavement repair the charge is \$20. In downtown districts this repair work required one bricklayer, three men, and a team at least half a day. Installation of covers or replacements of the old type, including the charge for restoring pavements, costs an average of \$56.50. The first replacement of the new reversible type, which means simply prying out the metal curb and turning it over without disturbing the pavement, costs \$5.50. After both shoulders of the ring or curb have been worn down, the ring can be replaced at a cost of \$6, plus only \$5.50 for labor.

With the new cover the base is set on the masonry and remains permanently in place. Resting on the base is the curb, which has two flanges or

ledges exactly alike, either one of which may be used to support the lid. This feature doubles the life of the cover and saves the adjacent pavement. Reversing the ring and hammering the pavement into place with a maul can be carried out within a few hours in a traffic-congested district without interrupting the continuous line of traffic on either side of the street.

Tests of New Manhole Cover

For testing the manhole curbs a heavy cast-iron base was provided, with the top grooved to receive the manhole curb casting. The curb fits the base close enough to prevent any lateral movement of the curb. A layer of riddled sand 1 inch deep was placed between the base plate and the casting under test, to insure an even bearing. The anvil was a heavy casting with the base machined to fit the curb in place of a standard lid. After each drop of a 1,200-pound weight at various distances, the casting was inspected for any cracks or distortions of metal which were con-



SOLVING THE PROBLEM OF MANHOLE CASTINGS IN CHICAGO

At left.—Worn-out manhole curb showing where flange is thin and broken. At right.—Replacing a worn-out Chicago standard manhole curb with new reversible curb on East Monroe Street, west of Michigan Boulevard

sidered the point of failure. Castings of the different designs were poured from the same ladle to make the tests comparative. For curbs the drop started at 6 feet and was increased by 1-foot increments until the casting broke or the limit of the electric hoist, 17 feet, was reached. For lids the test was started with a drop of 18 inches, which was raised by 3-inch increments until the casting failed as a result of the repeated blows.

Heavy lids weighing 155 to 158 pounds

broke at a load of 3,300 foot-pounds. All lids broke at the same height of drop, but the lighter sections deflected under the blow, and the weight rebounded after striking. Before breaking, the medium lids dished $3/16$ - to $1/4$ -inch at the center.

The new three-piece manhole cover was designed by Frank Shanley of the Chicago Bureau of Sewers. The test of the strength of covers was made at the plant of the Campbell, Wyant and Cannon Foundry Company, Muskegon, Mich.

Three Desirable Qualities in Street Lighting

A STREET-LIGHTING fixture should be inconspicuous by day and sink into its surroundings. No safer rule for selecting standards can be laid down, simply for the reason that in nineteen cases out of twenty there is not enough money available to give the standards such decorative value in themselves as justifies conspicuousness. There are, of course, delightful exceptions to this rule, particularly in the best foreign practise, as witness some exquisitely decorated standards along the Quai de Mont Blanc in Geneva and, for that matter, along the Thames Embankment. Generally speaking, rigid economy must be exercised in choosing the fixtures, and the most that one can fairly ask is that results shall be agreeably self-effacing. This furnishes a telling argument against the use of clusters.

In many situations it is desirable to allow a modest amount of light to turn upward so as to show the façades of the buildings. This assumes that the façades are of such character that they deserve to be lighted, which is not always the case. A rule always sound is that the intensity of illumination should be graduated in accordance with the situation, and this, with the present-day equipment of incandescent lamps, is a comparatively simple matter. It is much easier to hold a reasonable spacing and vary the illumination through the size of the lamp than it is to attempt to obtain a similar variation by changing the spacing. Occasionally both size and spacing must be changed, as when lamps are used merely as

markers along unfrequented streets. In general terms, two or three sizes of lamps are sufficient to give an adequate gradation of illumination on an incandescent circuit, and the usual arrangement of compensators gives facilities for providing sufficient variety of luminous output while retaining conveniently the same standard amperage on the circuit. At present the installation of underground circuits for the street-lighting service is simpler than in the old days, when a somewhat elaborate system of conduits had to be provided. Since the introduction of the steel-armored, lead-covered cable which can be laid in a shallow trench, underground service has been cheapened and simplified so that it is available in many districts where before overhead wires were a virtual necessity.

With suitably spaced lamps it is often worth while to consider the possibilities of dividing the system into two circuits, one operating all night and the other until midnight or 1 o'clock in the morning. If this plan be skillfully worked out, it not only reduces considerably the cost, but it does so in a strictly sensible and logical manner. In other words, it provides illumination which bears some relation to the hours of heavy traffic. Many a street requires the highest grade of lighting until, let us say, after the theater, and from that time on the needs are greatly reduced. In any event the split circuit operated in the way described is a vast improvement over that petty and mean economy, the moonlight schedule.

—*Electrical World.*

The Disposal of Municipal Refuse in Iowa

By Earle L. Waterman

Associate Professor of Sanitary Engineering, State University of Iowa

THE collection and disposal of municipal refuse is essentially an engineering problem which receives but little attention from municipal engineers. The garbage and refuse problem is one which concerns the comfort, convenience, and health of the citizens of a municipality. The elimination of nuisances to sight and smell caused by decaying garbage and unsightly piles of refuse around the home adds to comfort; the provision of receptacles for household wastes and the periodical emptying of them by collectors adds convenience; and the proper removal of these wastes reduces the health hazards that are present when this material is allowed to accumulate. The problem is one which should come under the public work or engineering department rather than the health department. The satisfactory solution of the wastes problem of a city calls for the same thorough preliminary study of existing conditions, the same degree of care in planning its solution, and the same careful supervision of its operation as does the problem of sewerage and sewage treatment.

Just as the sewerage system is designed to remove waste waters from individual homes, the garbage and refuse collection system should function to remove those wastes which are not water-carried, such as kitchen wastes, table refuse, waste paper,

tin cans, ashes and manure. The first two items are usually classified as garbage, and the others as refuse. These solid wastes are just as much the by-products of living as the water-borne wastes which we call sewage. Their removal from the premises

adds to the comfort and convenience of the people living there and helps to keep their environment clean—one of the first requirements of healthy living. Methods of house treatment, collection of garbage and refuse, and the disposal of them in such a way that they will not create a nuisance or be a menace to public health, do not call for as great an investment in engineering structures as do a sewage system and sewage treatment plant, but the writer believes that they do require careful planning and supervision, and

that their proper solution has much to do with public health and happiness. It is a municipal housekeeping problem, and the municipal engineer certainly should be charged with the municipal house-cleaning work.

The disposal of municipal refuse—and here the term "refuse" is used to include both organic and inorganic wastes which are not carried by water—is a problem which becomes more acute as a city increases in population. In the small towns and cities this problem does not usually assume proportions which demand its con-

Efficient Disposal

Efficient and satisfactory disposal of municipal refuse is the result of careful planning of the house treatment, the collection, and the method of final disposal of system wastes which are not water-carried. It is an engineering problem and should be recognized as such by both the public and the municipal officials.

The disposal of municipal refuse is not usually recognized as a municipal problem in Iowa cities of less than 15,000 population. In the smaller cities and towns the disposal of such wastes is left to the individual householder. The results are frequently unsatisfactory from a community standpoint.

Information concerning the methods of collection and disposal of municipal refuse in seventeen Iowa cities of over 7,000 population is given. Local conditions determine the methods to be used. The cost per capita varies with the extent of the service, the classes of refuse collected, and the method of disposal used.

sideration from a community standpoint; it is rather one for solution by the individuals. The results obtained are not always satisfactory from a community standpoint, since the individual methods vary with the intelligence and resources of the householder who is attempting to solve the problem, and are adopted to meet individual rather than community requirements. The methods commonly used include burning, burying, throwing out on the ground, and, most frequent of all, feeding to hogs and chickens. The majority of these methods are good when properly employed, but it is often the case that they are more satisfactory to the person using them than to his neighbors. An intensive house-to-

Census. It is interesting to note in the second column of the table that in the thirteen largest cities of the state—all cities having a population of over 16,000—the garbage collection is done by city employees or by a contractor for the city. Most cities have garbage ordinances which prescribe that garbage cans, of proper size and having tight-fitting covers, shall be set out at the rear of the house or at the alley for the convenience of the collector. Collections are made once or twice a week in the winter and two or three times each week during the summer months. In Clinton, Burlington and Muscatine, garbage collection service is furnished by the city only during the months of May to October, inclusive.

THE COLLECTION AND DISPOSAL OF MUNICIPAL WASTES IN IOWA CITIES

City	Population	Collection Made by	Wastes Collected	Method of Disposal			Costs per Capita for Yr. 1921	Paid by
				Garbage	Refuse	Ashes		
Des Moines....	126,468	City	Garbage	Burned on dp.			\$0.54	Tax
Sioux City....	71,227	City	All wastes	Fed to hogs	Dump	Dump	0.71	Tax
Davenport....	56,727	City	All wastes	Sanitary fill				
Cedar Rapids....	45,566	City	Garb. and ref.	Sanitary fill			0.38	Tax
Waterloo....	36,230	Contractor	All refuse	Fed to hogs	Dump	Dump	0.60	Tax
Council Bluffs....	36,162	City	Garb. and ref.	Incinerator				Indiv.
Clinton....	24,151	City	Garbage	San. fill			0.13 (5 mos.)	Tax
Burlington....	24,057	Contractor	Garbage	Buried			0.29 (6 mos.)	Tax
Ottumwa....	23,003	City	Garb. and ref.	Incinerator		Fill	0.35	Tax
Mason City....	20,065	City	Garbage	Incinerator			0.35	Tax
Ft. Dodge....	19,347	Private col.	Garb. and ref.	Fed to hogs	Dump			Indiv.
Muscatine....	16,068	City and cont.	All wastes	Fed to hogs	Sanitary fill		0.26 (6 mos.)	Tax
Keokuk....	14,423	Private col.	Garbage	Fed to hogs				
Boone....	12,451	Private col.	Garbage					Indiv.
Iowa City....	11,267	Contractor	Garbage	Fed to hogs			0.14	Tax
Oskaloosa....	9,427	Private col.	Garbage	Fed to hogs				Indiv.
Creston....	8,034	Private col.	Garbage					Indiv.

house sanitary survey in a town of 900 population showed that the kitchen garbage was disposed of as follows:

Method	No. of Instances
Fed to chickens or hogs.....	118
Burned	40
Thrown out on the ground.....	15
Partly fed and partly burned.....	13
Taken by collector.....	12
Buried	1

Other surveys made by the writer indicate that this summary is a typical picture of the garbage situation in the average Iowa town and small city.

Except in small residential suburbs adjacent to a large city, the problem very rarely receives community attention in cities of less than 5,000 population.

The costs per capita of municipal refuse collection and disposal as shown in the following table have been computed on the basis of the 1921 expenditures in each city and the population as recorded by the 1920

Four cities report that the collection of municipal refuse is a matter of private enterprise. Although definite information is not at hand, it is quite probable that in these cities there are ordinances which regulate the manner of disposal of the wastes. As indicated in this table, there is only one city of less than 15,000 population in which the collection of municipal refuse is handled as a community problem, and only in the larger cities is refuse other than garbage collected by the municipality.

There is some variation in the extent of the collection service in per cent of area of the city. Des Moines reports less than one-half, but practically all thickly settled portions; Sioux City and Cedar Rapids, 75 per cent; Clinton, 66 per cent; in Waterloo, Council Bluffs, Burlington, Ottumwa and Mason City practically the entire area is reached by the collection wagons. The character of street surface and the location

of alleys seem to have some influence on the extent of the service. In some cities it is almost impossible to get uninterrupted service if the house is located on an unpaved street. In other cities where the collection wagons use the alleys, the service is not furnished to property which abuts on an alley that is not cut through from one street to another. Density of population is another factor which is taken into consideration by city officials in planning the extent of the collection service, since the thinly populated outskirts are frequently not given the service.

In considering questions of collection and disposal, municipal wastes are divided into three classes—garbage, refuse and ashes. As will be noted in column 3 of the table, some cities collect all three classes, others only garbage and refuse, and some only garbage. Unless the refuse and ashes are used in connection with the disposal of the garbage, it appears that the collection of these municipal wastes is not considered a public responsibility. In some cities the street department will remove refuse and ashes upon request, but the cost of the service is charged to the householder. For many of the small cities and towns in the state, "Clean-up Week" is an annual affair. These campaigns are held in the spring, when householders are urged to place all refuse and ashes either at the street curb or near the alley where city teams can reach them. This work is usually done at public expense and is a satisfactory method of cleaning up the winter accumulations of ashes and refuse in small municipalities.

Methods of Disposal

The methods of disposing of the municipal wastes in Iowa cities comprise feeding to hogs in 7 cities; incineration in 3 cities; making a sanitary fill in 3 cities; and burning on a dump in 1 city. Refuse is burned in an incinerator in 2 cities, and disposed of at city dumps in the other instances reported. Ashes are used for filling streets in 1 city, and used in connection with sanitary fills at other places.

Feeding to hogs.—In most instances where the municipal garbage is fed to hogs, the hogs are owned by private parties who are either contractors collecting the garbage or individuals who receive it from the collectors. In Waterloo and Ft. Dodge private

companies collect the garbage and use it for hog-feeding. Sioux City is the only municipality in our list which owns its own hogs and hog farm.

Sanitary fill.—In some of the cities in Iowa both garbage and refuse are used for filling in low land. This method is economical and satisfactory where it is properly done—but a cause of many complaints when it is not carefully planned and executed. It is reported as being satisfactory at Davenport, where low land along the Mississippi River is being filled and reclaimed. Here piles of ashes and dirt are spaced along the top of the embankment so that there is just room for the garbage wagons to back in between the piles and discharge their loads of garbage on the face of the bank. As soon as the wagon is pulled out, men with long-handled shovels cover the garbage with 8 to 10 inches of earth and ashes. Approximately 2 cubic yards of covering are required for each 1½ cubic yards of garbage. It is occasionally necessary to obtain cover material from outside sources, as the amount normally coming to the dump is not always sufficient.

Incineration.—In Council Bluffs, Mason City, and Ottumwa, incinerators are used for the disposal of municipal wastes. This method has also been used in Des Moines, but it is reported that "the operation of the incinerator has been abandoned because of excessive costs." Costs of operation as reported for Mason City and Ottumwa do not appear to be excessive. In Council Bluffs the cost of service is paid by the people for whom the service is rendered, and not by a tax levy, as is the case at Mason City and Ottumwa. The City Clerk at Council Bluffs states that the incinerator in that city has been in operation for several years and that as far as the garbage problem is concerned they consider that it is satisfactorily solved. The State Sanitary Engineer makes the following comment on the Council Bluffs incinerator:

"All the garbage and refuse, except ashes and tins, is hauled to an incinerator and burned. From 65 to 75 pounds of coal is used per ton of garbage, and they have no trouble. The incinerator is located very near the residential district, and it is so clean and so free from odor that you would not know it was there unless you saw it."

Costs of Collection and Disposal

Two methods of financing the collection and disposal of municipal wastes are used by Iowa cities. Some cities meet this expense by a general tax levy, while in other cities the service is paid for by the individual householders. Unless the service is general, covering the entire city, it might well be argued that the costs should be met by those who are benefited. At the same time it will be generally admitted that there is a benefit accruing to the general public even though only a part of the municipal wastes are removed.

The figures given in the next-to-last column of the table have been computed on the basis of the annual expenditures for the collection and disposal of municipal wastes as

reported by city clerks, and the populations of the respective cities as shown in the 1920 U. S. Census reports. There is a considerable variation in the costs per capita for all-the-year service—the maximum being \$0.71 in Sioux City, and the minimum \$0.14 in Iowa City. These differences are undoubtedly due somewhat to local conditions and depend also on the extent of service. A very complete service is evidently given at Sioux City, where all classes of municipal wastes are collected and disposed of by the city. In Iowa City only the garbage is collected, and this service covers only a part of the city area and is reported as not being satisfactory.

ACKNOWLEDGMENT.—From a paper read before the Iowa Engineering Society.

Advice from Alger County, Mich., on Keeping Roads Good

Maintenance of improved roads has often been neglected.

As a result, costly improvements have gone to ruin.

Insufficient funds for maintenance have been largely to blame.

No financial oversight can be more disastrous than failure to provide for our improved highways.

The character and volume of traffic determine the type of road to build, provided adequate maintenance is assured.

Economy, therefore, can be had only when proper maintenance is guaranteed.

No part of highway work requires more skillful supervision than maintenance.

A slipshod method of maintenance will ruin the best of roads.

Nowhere is there a greater field for application of sound business principles than in public highway maintenance.

Constant attention to detail, combined with close study, produces efficiency.

Efficient maintenance—the secret of public highway success.

Modern Jet Condensers in Small Lighting Plants

By R. E. Hellmer

Engineer, Condenser Department, Schutte & Koerting Company

EDITORIAL NOTE.—Condensing equipment is essential to the economical operation of a steam power-plant. For the purpose there are many makes of condensers, but all can be grouped into two classifications—surface condensers and jet condensers. The question as to which is the better type to employ in a particular power-plant should be determined wholly by the operating conditions that exist at the plant.

CONDENSERS are generally classified into surface condensers, in which the exhaust steam and the condensing waters are kept separated by the heat-transmitting surfaces; and jet condensers, wherein the steam comes into direct contact with the water. The condensed steam, water, air, and other non-condensable gases are removed by suitable pumps or a barometric column, or by means of the kinetic energy of water jets.

The choice of a condenser depends primarily upon the quantity and quality of

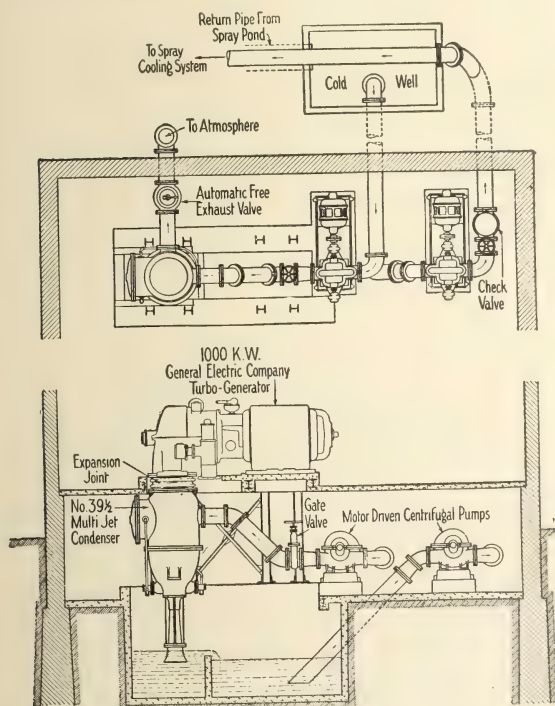
water available for condensing purposes. Where there is an abundant supply of fresh water that is sufficiently pure for boiler feeding purposes, the most suitable type of condenser to install is some form of jet condenser. Under these conditions, such a condenser is probably the lowest in first cost and the most economical in operation.

The surface condenser is ordinarily chosen in instances where there is an abundant supply of cheap feed. If the feed water must be drawn from the same source of supply, a water softening or purifying plant or an evaporator is necessary to make up the loss of feed water due to leakage.

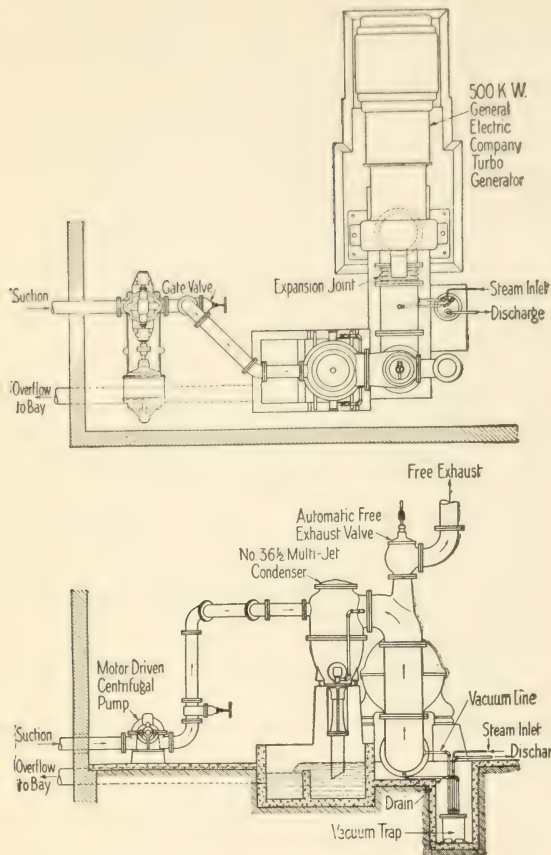
If the water-supply is limited but of good quality for boiler feed, a jet condenser would probably be the best one to install, together with some form of recooling plant of sufficient capacity to reduce the condensing water temperature to a point low enough for continuous working. By limited supply is meant a supply that is not sufficient in quantity to be discharged to waste, and relatively expensive to obtain.

Where there is a limited supply of water, unsuitable for boiler feed, a surface condenser should preferably be installed and operated in combination with a water cooling plant of ample capacity for continuous working, and with a water softening or purifying apparatus to make up the loss in boiler feed.

The illustration on this page shows the arrangement of a 1,000-kw. jet condenser serving a General Electric turbine-generator unit in-



PLAN AND ELEVATION OF JET CONDENSER CONNECTED TO A 1,000-KW. TURBINE-GENERATOR IN THE MUNICIPAL ELECTRIC LIGHT PLANT, LANSDALE, PA.



JET CONDENSER MOUNTED ABOVE THE FLOOR LEVEL AND CONNECTED TO A 500-KW. TURBINE-GENERATOR IN THE MUNICIPAL ELECTRIC LIGHT PLANT, EDENTON, N. C.

stalled in the municipal electric light plant, Lansdale, Pa. The condenser is designed to handle 22,000 pounds of steam per hour, and to produce a 27-

inch vacuum with 95 deg. F. water. It is located immediately below the turbine exhaust and is connected to the turbine by means of a copper expansion joint as shown. The diagram clearly illustrates the arrangement of the motor-driven injection and spray pumps. The condenser injection pump takes its suction from a cold well outside the power-house. This cold well is supplied with water from a spray pond located 300 feet away. Provision is made to maintain the water in the hot well at the desired level by means of float-controlled valves and switches.

The second layout represents the condenser installation at the municipal electric light plant, Edenton, N. C., and shows a 500-kw. G. E. turbine-generator connected to a multi-jet condenser with motor-driven pump. The absence of a basement and the fact that the tide water from the adjoining bay rises to within two feet of the turbine room floor, made it necessary to place the condenser above the floor line in order to provide for the gravity of the hot-well overflow to the bay. The exhaust loop is drained by means of a vacuum trap installed about three feet below the lowest point of the exhaust pipe.

The municipal light plant, Greenville, Texas, has recently installed a 500-kw. G. E. turbine-generator and multi-jet condenser designed to maintain a vacuum of 27 in. with 85 deg. injection water.

ACKNOWLEDGMENT.—Abstracted by permission from the *General Electric Review*.

The Cost of Water-Main Extension

ACCORDING to Dow R. Gwinn, President and Manager, Terre Haute Water Works Company, Terre Haute, Ind., it costs a little over \$1.80 per foot to furnish and lay 6-inch Class B cast iron pipe at \$64 per ton. On this basis, the cost of an extension for a block of 365 feet, including the fire hydrant, valves, valve-boxes and a 6-inch tee, is \$829. If it is necessary to cut into a main and insert a special for a connection, the cost is

greater.

The cost of connecting new lines with existing mains is sometimes overlooked. It is expensive to shut off a main, cut a piece out of it, pump out the water that is in the main, insert a special, cut a piece of pipe to close the gap, put on a sleeve, and make four lead joints. It sometimes happens in Terre Haute that the water from the pipe softens the earth so that there is a caving of the bank.

Notable Features of Detroit's Fire Alarm Equipment

By Louis Gascoigne

Superintendent of Fire Alarm Telegraph, Detroit, Mich.

THE completion of the new fire alarm central office in Detroit, in October last, gives that city, it is believed, the best system of protection in the world from the fire alarm standpoint. The type and extent of the central office, the number of boxes on the street, and private fire alarm systems installed by the leading industrial concerns, the list of factories with connection to the city circuits, the protection of the schools, hospitals, theaters and other panic spots, and the high percentage of box alarms support Detroit's claim.

The new central office is located in a beautiful isolated building on the corner of Macomb and Hastings Streets. It is devoted exclusively to fire alarm apparatus and is fire-proof throughout.

The new equipment gives Detroit a capacity of one hundred circuits without additional boards. Eighty of these circuits have already been put into service. The central office has been built sufficiently large to furnish a maximum capacity of four hundred circuits. The relay boards, over which the box alarms are received, and the storage battery switchboards are divided into ten units of ten circuits on

each board. Two ten-circuit gong boards and two ten-circuit joker boards are provided for sending the signals to the engine-houses. Protector boards, with one hundred and forty circuits capacity, guard the central office apparatus against lightning and foreign currents. All these boards are mounted in art metal cabinets with mahogany finish, combining attractive appearance with fire-proof qualities. Twenty five-circuit registers, together with time stamps and take-up reels, are provided for recording signals received from the boxes and also for permanently recording the signals sent out to the engine-houses. Four art metal pedestals are provided for mounting these registers in units of five registers each.

The city has also ordered a new-style keyboard transmitter, which is now in the last stages of completion and will be installed shortly. This new keyboard transmitter represents a very material advance in the art of transmitting signals. It is so arranged that at the first blow of a box alarm the glass which protects the instrument automatically drops down into the base of the transmitter, so that the operator will not be delayed in getting at the keyboard. It is similar to a typewriter in operation, and after the keys are depressed, the numbers are shown on a dial at the top. It makes possible a speed and an accuracy impossible in any previous transmitter. It can be set for either fast or slow time transmission and has facilities for fifteen code signals.

Every Block to Be Protected

Two thousand boxes have been installed on the streets, which is a greater protection per square mile or per thou-



CENTRAL OFFICE, DETROIT FIRE ALARM TELEGRAPH SYSTEM

sand population than is found in any other city in the country. A definite program has been followed of adding seventy-five boxes to the system yearly, and this is to be continued until the city has the protection of a box a block in all built-up sections. The leading industrial concerns of the city have fire alarm systems which exceed in completeness those of most of the smaller cities of the country. The larger concerns have spent over one million dollars for alarm systems for the purpose of calling their own private fire brigades. Ford has a twelve-circuit system, with over four hundred boxes, and is equipped with a semi-automatic repeater and the necessary battery equipment. Dodge Brothers has an eight-circuit system, with nearly two hundred boxes, and Cadillac Motor and the Morgan & Wright Branch of the United States Rubber Company have also nearly two hundred boxes each, with the necessary repeaters, switchboards, etc. The General Motors Building, the largest office building in the world, has what is perhaps the most complete system in service anywhere in such a building.

All these systems are for calling the private fire brigades of the various companies. In addition, there are five hundred concerns which have direct connection with fire alarm headquarters, so that they can have the protection of the city fire department in the shortest space of time.

The panic spots, such as the schools, hotels, theaters, and other places where the public congregate, are better protected in Detroit than they are in any other city where records are available. Virtually every one of these places is protected by a fire alarm box that is directly connected into the city circuits, and the value of this protection has been shown by the splendid record that the Detroit Department has made in saving life.

Detroit has, perhaps, the highest percentage of alarms from boxes of any city in the country. This is due to two factors: first,



INTERIOR OF DETROIT CENTRAL OFFICE

sufficient boxes have been installed to make it easy for anyone discovering a fire to send in the alarm; and second, there has been a tremendous amount of educational work with the public to convince them that the fire alarm box is the only safe method of transmitting alarms of fire. The Detroit Board of Commerce in one campaign distributed, through the medium of the Boy Scouts, 125,000 cards showing the importance of using the nearest fire alarm box and giving a detailed account of the method of operation. These were tacked up in over 100,000 homes in the city, and the result from this work has been extremely gratifying to the department.

The system was installed by the Game-well Company under the direction of the Detroit Fire Commissioners, consisting of Charles F. Clippert, William E. Metzger, William J. Chittenden, Jr., and C. Hayward Murphy. The value of this fire alarm protection has been proved repeatedly to the satisfaction of the fire department officials and other city authorities in Detroit. The growth of Detroit and the nature of the manufacturing both tend to result in a high fire loss, but in spite of these natural factors, which should adversely affect the fire loss, there has been a most satisfactory control of it. Detroit believes to-day it is the best-protected fire alarm city in the world, and according to present plans will continue to improve its system, as the city officials appreciate that safety of the lives of the citizens depends largely on the completeness and efficiency of the fire alarm system.

The Value of Water-Waste Surveys

A Collection of Reports Outlining Methods and Benefits

The Results of a Three Years' Survey in Boston, Mass.

By F. A. McInnes

Former Division Engineer, Water Division, Public Works Department, Boston, Mass.

THE city of Boston has contracted for the last three years for water-waste surveys which have covered to date about 600 miles of mains, or approximately 70 per cent of the total length of mains in the city. The work has been done under five separate contracts, covering different sections of the distribution system. The agreement provides that each section be divided into districts; that the consumption of each district be determined for 48 hours; that those districts in which the maximum night rate exceeded the daily average consumption by more than 50 per cent be subdivided; that tests be made of services to all large consumers, to determine possible illegal use of unmetered matter; and that all meters larger than 3-inch be tested for accuracy.

To the end of 1922, 296 separate leaks had been located, 244 of which were in lead services; 44 were blown joints, 2 broken mains and 6 miscellaneous. These leaks ranged in size from a nail hole in a $\frac{5}{8}$ -inch lead service wasting 5,000 gallons per day, to a broken 4-inch pipe discharging 660,000 gallons per day into a trunk sewer. A total of approximately 10,250,000 gallons per day of leakage has been discovered and stopped.

The average daily consumption in Boston in 1922 was 85,098,000 gallons per day, or 112 gallons per capita; in 1920, when the waste survey began, it was 94,297,400 gallons per day. Tests made of large meters show a daily loss through underregistration in excess of 2,000,000 per day, and one case of illegal unmetered service was found. About 70 per cent of the services in Boston are metered.

The survey has cost the city \$67,300, and in addition the city has furnished and in-

stalled the necessary corporation cocks, supplied labor for operating valves, furnished shelter boxes for the protection of the contractor's instruments, and furnished the necessary transportation for conducting the survey.

The method followed in making the survey has been to outline a section and divide it into districts of approximately 30 blocks each. Each district is formed by closing a line of gates around its boundary, supplying it through one pipe only. A recording Pitometer is then inserted into this feed pipe through a 1-inch corporation cock, and a continuous measurement is made of the flow into the district for a period of 24 hours. When an excessive night rate, not accounted for by industrial consumption, is found, the district is supplied through a smaller main at night, and by closing inside and opening outside valves, the boundaries are gradually contracted to the recording instrument in the small pipe feeding the district. As each block is cut out, the drop in consumption recorded by the Pitometer indicates the amount of leaks in that block. To locate the actual leak, different methods are employed: sometimes aquaphones are applied to the service; sometimes microphones or stethoscopes are used on the ground over the pipe; sometimes iron bars are driven down through the ground to the pipe at intervals.

The waste surveys have much more than justified the expense involved, both from an immediate point of view and from a future outlook as well. All gaging stations have been made permanently available, and the city is now in a position to continue the work, which to be fully effective must be continuous and carried on as part of the maintenance work.

Survey in Grand Rapids Untangles Distribution Troubles

By **Walter A. Sperry**

Director of Public Service, Grand Rapids, Mich.

GRAND RAPIDS has recently completed a water-waste survey which has cost the city about \$10,000 and has covered the entire water-works system of the city. A portion of this work was carried on in 1921 and the remainder has been done since that date. The city was divided into three districts which were natural divisions, the report covering these districts individually.

The local situation has been peculiarly fortunate, since the surveys have revealed practically no large breaks in the water-mains. This is a very unusual feature in that in nearly all cases where surveys have been made, the cost of the survey has been saved to the city in the main leaks detected and stopped. In the case of Grand Rapids this has not been true, but we have found the survey of very great value in the information it has given as to broken valves, valves open that should have been closed, and other similar situations.

There has also existed in this city an unusual condition. In 1919 the city took over the entire property of a water-works system of small capacity whose pipes

were laid parallel to the city pipes and which covered a considerable area that was more or less cross-connected. The records of the company purchased by the city were very inadequate, and the city's knowledge and records were deficient. The water-waste survey succeeded in thoroughly disentangling this condition and gave us an accurate record of the exact condition of this system with reference to itself and its relation to the city mains. This also was considered very much worth while.

It is felt in Grand Rapids that while the water-waste survey did not reveal any leaks, it has been of very great value in the information it has yielded concerning this particular mix-up of pipes and in the general information it has given about the entire system with reference to broken valves, connections of which we had no record, and other conditions of that type. It will enable us to thoroughly revise and bring up to date our water atlases and city maps, and will yield many suggestions of value in improving the general operation of the system and preventing further unknown cross-connections and water losses.

Survey in Detroit Shows Considerable Loss in Small House Meters

By **Carl O. Barton**

Department of Water Supply, Detroit, Mich.

THE water-waste survey which was recently completed in Detroit covered 1,151 miles of main, 24 inches and under in diameter. It was considered inadvisable to include any mains larger than 24 inches, because these mains were required as feeders, and a few important 24-inch feeder mains were also omitted.

A total underground leakage of 9,557,000 gallons per 24 hours was detected by the Pitometer engineers and repaired by the Department of Water Supply. The two largest sources of water waste discovered

were a 6-inch blow-out off a 42-inch main, which was partly open and which was wasting 750,000 gallons per 24 hours, and a 6-inch main which was broken in two places, wasting 312,000 gallons per 24 hours.

All large meters were tested in the course of the survey. In one case it was found that the Department was losing the revenue from 432,000 gallons of water per 24 hours, because of the underregistration of a single meter. It is estimated that the loss in revenue due to the underregistration of large meters was approximately \$51,000 per

year. The Department is now making regular Pitometer tests of all large meters and immediately repairing those found defective.

The survey demonstrated that considerable revenue was lost because of the inability of many small house meters to register small flows; these meters are now being regularly removed to the meter shop for tests and repair. Many meters were found to be larger than the consumption warranted; all such meters are now being replaced by smaller ones. House waste due to fixture leakage amounted to 22,589,000 gallons per day. The Department's inspec-

tors notified, in writing, each owner of defective fixtures, and made a second inspection in the case of unmetered services, to insure the repair of the fixtures.

In the course of the survey, most of the valves in the system were inspected. A report of valves found defective was filed with the Department, and such valves were immediately repaired. The results of the survey were so satisfactory that since its completion the Department has established its own Pitometer division in charge of an engineer formerly with the Pitometer Company, thus providing for continuous inspection to minimize water waste.

Baltimore City Water Department Finds That the Cost of a Water-Waste Survey Is Justified

THE water-waste survey now in progress in the city of Baltimore was inaugurated in June, 1920. Previous to this, however, much Pitometer work had been done, but owing to the war and the ensuing curtailment in the number of employees, it was necessary to abandon the work. The present survey is larger in the scope of its operation, and the general procedure is applied in greater detail. The water distribution system in the city is divided into three zones, commonly referred to as the Low, Middle, and High Service Zones of Distribution. Low service is fed by a gravity supply from a reservoir, located at the filtration plant, which also serves as suction for the pumping-station supplying the middle service zone. Water for the high service zone is pumped, being lifted from a middle service reservoir to a stand-pipe. As the heavy water consumption, practically 67 per cent of the city, is in the low service zone, all measuring activities are confined at present to that area.

For facility in measuring, the entire low service zone has been divided into a number of areas known as districts, which are in turn subdivided into sections, the units measured at one operation. To date, four districts, totaling twenty-two sections, have been surveyed.

Pitometer surveys are usually considered to be conducted for the sole purpose of saving water; that is, to reduce the daily consumption, with whatever financial gain

that may imply. Although locally the survey was inaugurated primarily for this purpose, it has been our experience that the greatest value of the work has been in other fields. The close examination of the distribution system required by Pitometer surveys permits of much maintenance work which would otherwise be left undone. Aside from detecting broken valves and underground leaks, the survey eliminates dead ends, joints and private pipes, sewer blows, and other minor matters, which, though in themselves of small importance, combine to lower the efficiency of the distribution system and greatly increase the cost of maintenance.

The procedure followed in Baltimore is to completely isolate the section being measured and supply water through one main, the flow on which is recorded. At the same time that this measurement is made, all large meters are read and the consumption of the smaller estimated, so as to divide the total consumption into the domestic and the commercial demand. Following this measurement, the distribution system is subdivided into the smallest possible units, so as to secure a rate of flow on each section thereof. This work is done at night, to eliminate any large draft by consumers. Following this, all plumbing fixtures are inspected, and according to the rates of flow, indicated by the subdivision, investigations are made to locate underground leakage. Following all possible elimination of waste, the final measurement based upon the

initial procedure is made. By comparing these two measurements, all the pertinent information and comparisons can be obtained.

Obviously, before the actual measurement, much investigating and repair work must be completed, thereby benefiting the entire system. In conjunction with the survey, fire hydrants are flowed, to remove any deposited matter and to improve the circulation. With this work as a basis, it is possible to ascertain the general direction in which the water is flowing within the boundaries of the section and to determine which water-mains are overtaxed and should be increased in size, and conversely, which water-mains are delivering very small quantities and are useless to the system. The actual quantity of water which the system is capable of delivering is ascertained by means of flow tests.

It is rather difficult to state exactly in terms of dollars what benefit the city has derived from the survey. Of course, it is possible to make a summation of the various quantities of water saved in each section, and by applying to this quantity an average water consumption rate of 70 cents per 1,000 cubic feet, based upon the recommended schedule of rates for the water department of the city of Baltimore, to compute the equivalent saving. Although such statements are often made to justify the cost of a survey, this method is a fallacy. Here in Baltimore, within certain restrictions, the water-supply is unlimited, in the sense that we have more water to sell than the present consumers demand; that is, we have a continual unsold surplus. The water saved would have the value designated if there were consumers ready to buy the quantity in question. As it is, however, this decrease in the consumption is merely adding to the unsold surplus, and any gain to the city is the cost of impounding, filtering, pumping and delivering this quantity. On this basis the water saved has cut down the cost of pumping and filtering at the Montebello filters \$61.44 per day. A decrease in the water consumption will, however, save money in the sense that it will ward off for additional years the necessity of enlarging the water-works.

How the Survey Helps Other Departments

There is a direct relation between the amount of water consumed in any building

and the amount of sewage and waste water issuing therefrom. In the area now being measured, sewage flows by gravity to a pumping-station which raises it to a point sufficiently high to allow of a gravity flow through the outfall sewers to the disposal plant. Any reduction in the water consumption of this area is therefore directly reflected by a corresponding reduction in the quantity of sewage pumped. In connection with the subject, curves have been plotted showing the total water consumption and the total amount of sewage pumped on corresponding days, the results complementing each other to such an extent that the curves are practically parallel, a reduction in the water consumption being coincident with the reduction in the amount of sewage.

A Pitometer survey may therefore be regarded as financially justified. To the Water Department itself, considering only a reduction in expenses for impounding, filtering and delivering a certain quantity of water, the saving is large. To the taxpayers in general there is the saving effected by deferring for a number of years the necessity for increasing the water-works plant, thus saving the sinking fund and the interest on the capital investment. The Sewer Division of the Highway Department is also benefited by the reduction in its pumping charges.

In all, an area covering 5.93 square miles having 152.74 miles of water-main, a population of 163,015, and a consumption of 30,873,333 gallons a day at the time of the first measurement has been measured. This consumption was reduced through Pitometer work by 6,499,280 gallons, equivalent to a saving of 21 per cent, approximately one-half of this amount being leakage inside of the curb stop and due to the negligence of the consumer. This water if sold would net a yearly return of \$218,937.60.

The length of time spent in a section varies according to the character and extent of the area being surveyed and is also dependent upon the physical condition of the distribution system; that is, whether or not extensive repairs are required. In the past year the cost of surveying a section has averaged approximately \$1,000, being about \$168 per mile of water-main, but by better coordination of the various factors entering into the work, the cost is being slightly decreased.

Water-Waste Surveys Are Enlightening

By Arthur T. Clark

Superintendent of Water-Works, Herkimer, N. Y.

WE have had a water-waste survey made of the distribution system of the Herkimer water-works and believe that the results obtained were worth many times the cost of the survey. The important results of such a survey cannot help but be enlightening, and even though no glaring defects are located in the distribution systems, the value of the survey continues to manifest itself in the operation of the system for years afterwards.

The survey cost the city of Herkimer \$1,-250, which could not have been better invested in increasing the operating knowledge of the water-works. The pumps were tested at varied rates of speed, giving the

corresponding capacity and the percentage of slip from the rated capacity. The distribution system was divided into sections, and permanent Pitometer manholes were constructed, so that the variations in draft requirements could be determined. The total leakage and the location of all large leaks were determined, and all defective valves and hydrants, which otherwise would have been undetected, were definitely located. We found that the survey gave us a daily per capita consumption exclusive of industrial use and leaks, which, once accurately determined, gave reliable figures for future calculations of consumption, and a yardstick for gaging water waste.

Running Down Losses in Ogdensburg, N. Y.

By Charles H. Lord

Superintendent of Water-Works, Ogdensburg, N. Y.

IN conducting the water-waste survey of the water distribution system in Ogdensburg, N. Y., the system was divided into five districts, not including the 14-inch line to the State Hospital, and a measurement of the consumption in each district was made for a period of 24 hours. The total average daily consumption and minimum night rate obtained from the district measurements was as follows:

Average daily consumption	3,070,000 gallons per 24 hours
Minimum night rate	2,407,000 gallons per 24 hours
Per cent night to day rate	78.5 per cent

This percentage of 78.5 is high and indicates a large percentage of waste. Subtracting the State Hospital rates from this, we have the following in the remainder of the system:

Average daily consumption	2,564,000 gallons per 24 hours
Minimum night rate	2,050,000 gallons per 24 hours
Per cent night to day rate	80 per cent

Of the minimum night rate of 2,050,000 gallons per 24 hours, 1,907,000 was accounted for by subdivision, leaving a discrepancy of 143,000 gallons per 24 hours,

which is partly due to a change of consumption between the time of district measurement and subdivision and partly to a reduction of pressure caused by operating values. The 1,907,000 gallons per 24 hours was found by the survey to be distributed as follows:

	Gallons per 24 Hours
Underground leaks	346,000
Submerged leaks	66,000
Metered commercial use	289,000
Unmetered commercial use	168,000
Free water	183,000
House waste, inspected	349,000
House waste, to be inspected	150,000
Small scattered rates	356,000
	1,907,000

A total underground leakage of 346,000 gallons per day was found, caused by two joint leaks, one cracked main, and twenty-three service leaks, and in most cases no sign of the leak could be seen from the surface of the ground. All but a few of the small service leaks have been located, dug up and repaired, and the rest are being attended to. A leak of 66,000 gallons per day was located in the 8-inch line under the Oswegatchie River at Spring Street. A

diver was sent down and found it to be caused by a crack in the pipe near the place that had been previously repaired. This leak was being repaired at the time of the completion of the survey. House waste amounting to 349,000 gallons per day had been inspected at the time of the completion of the survey and was found to be caused by 171 fixture leaks.

A total avoidable waste of 761,000 gallons a day due to underground leaks, one submerged leak, and house waste was discovered in the distribution system by the survey. Of this, 411,000 gallons was caused by underground and submerged leaks and has been permanently stopped by locating and repairing the leaks. The house waste, amounting to 349,000 gallons a day, presents a more difficult problem. This can be temporarily stopped by house-to-house inspection, but cannot be kept at a minimum unless inspections are made very frequently. It is best combated by a program of selective metering, putting meters on those places that have been found wasting the most water.

The unmetered commercial use of 168,000 gallons a day has been a loss to the water-works and probably does not repre-

sent the total loss due to this cause, as it is very likely that the increased day use above this amount is more than the places concerned have been paying for.

At the beginning of the survey the total minimum night rate of the entire system was 2,460,000 gallons per 24 hours, which included 250,000 gallons going to the paper mill. Just before the survey was completed, after the two joint leaks, the cracked main, a large service and a few small service leaks had been repaired, the total minimum night rate was 1,780,000 gallons per 24 hours with the paper mill shut off. This reduction of 680,000 gallons per 24 hours less 250,000 gallons, leaves 430,000 gallons per 24 hours, which represents the saving caused by the survey up to that time. The submerged leak and most of the small service and fixture leaks had not been repaired at that time. About 275,000 gallons per 24 hours in underground leaks had been repaired, two fountains amounting to 22,000 gallons had been shut off, probably 50,000 gallons in house waste had been stopped, and the rest was due to a reduction in commercial use where meters had just been installed. The water-waste survey has thus been of great value to this department.

Breaking of Frozen Idle Mains Caused Large Loss

By H. M. Beardsley

General Manager, Elmira Water Board, Elmira, N. Y.

THE records of the water department of Elmira, N. Y., some time ago showed discrepancies between output and consumption indicating either that there was considerable leakage or that some of the large industrial meters were not registering properly. The water-waste survey which was instituted included 48-hour measurements of the total consumption of the city and the amount of water pumped from the river to the filtration plant. A map of the distribution system was then made and the city divided into eight districts. The boundaries of each district were indicated on the map, and the gaging point for the installation of the Pitometer was set up in each district. The tests of the individual districts were very interesting and brought to light much that was unexpected.

Two Large Leaks Discovered

One leak was discovered in Woodlawn Cemetery, where the water is shut off every winter. Apparently some water had remained in the lines and had frozen and burst the pipes. Owing to the gravelly nature of the soil, the water did not come to the surface and was being lost at the rate of nearly 100,000 gallons per day.

A second large leak was discovered at the corner of Water and Hoffman Streets, where a part of the lead had blown out of the joints in a 20-inch distributing line. As the joint happened to be in a sewer man-hole, water was running away without coming to the surface. The loss here also amounted to at least 100,000 gallons per day.

A number of smaller leaks were discovered, ranging from 10,000 to 25,000 gal-

lons per day, and the value of the water lost through all of the leaks discovered and now being saved through repairs in the mains and services in one year amounted to enough to pay the cost of the survey, twice over.

A test was made of the Venturi meter from the 30-inch supply line by establishing a gaging point near the filter plant. This test was most satisfactory, as it confirmed our own tests made frequently by a manometer as to the accuracy of the Venturi meter and the records and statistics made up from its measurements.

As pumping mains are subjected to more or less hard usage because of the varying and sometimes unusually high pressures they are subjected to, a special test was made of the 24-inch lines in Hoffman

Street, which supply the filter plant with water. The results of the test showed that the force main was in excellent condition as regards leakage.

In addition to testing the mains for leaks, all 4-, 6- and 8-inch meters were tested in place. These meters generally were found to be in excellent condition, but one of them was found to be 20 per cent slow, and the added revenue from this consumer for one year helped materially in paying the bill for the test.

We are thoroughly satisfied with the result of the leakage survey and found it most profitable in every way. Our output is now mounting up again and we are seriously considering checking up some of our lines, valves and meters by another water-waste survey.

Unmetered Fire Lines a Source of Loss in Oswego, N. Y.

By William A. McCaffrey

Superintendent of Water-Works, Oswego, N. Y.

DURING 1920, the city of Oswego made an extensive survey of its water distribution system for water waste and found that approximately 1,000,000 gallons per day was being lost through unmetered fire lines. These lines were leaking under concrete floors in buildings, and the water was seeping away into the sewers. One line had been leaking for five

years at the rate of 134,000 gallons per day. The owner of the plant stated that he thought the water was coming from a spring.

A leak of 750,000 gallons in a 20-inch main running under the river and several leaks of from 60,000 to 100,000 gallons in various parts of the system were discovered and repaired.

Water-Waste Survey Helps Richmond City Water-Works

By H. A. Dill

Superintendent of Water-Works, Richmond, Ind.

THE water-waste survey made of the distribution system of the Richmond City water-works in 1920 located one cracked 6-inch main, 3 open service pipes, 10 service leaks and 8 hydrant leaks, totaling a loss of 268,000 gallons in 24 hours. The leaks through house waste were shown to be 365,500 gallons in 24 hours, of which 60 per cent were metered. In addition, the survey showed leakage amounting to 157,000 gallons, too small to be divided into blocks with the Pitometer.

The leakage of the 6-inch main mentioned above amounted to 140,000 gallons a day. It was located 5 feet underground and wasted into a near-by sewer with no indica-

tion of the leak on the surface. Seven fire lines were tested and found to be in good condition.

In carrying on the survey a large number of valves had to be operated, most of which were in good condition; others showed need of stem packing, so that the survey was also quite valuable in this respect.

The estimated saving due to stopping underground leaks, figured at 2½ cents per 1,000 gallons, would amount to about \$2,500 a year. This in one year offsets the cost of the survey, which is considered to have been a very profitable expense to the water department.

A Combined Deep-Well and Surface Water-Supply

Deep-Well Water Restores Alkalinity in Treated Water
and Furnishes Entire Supply in Emergency

By George P. Womble

Superintendent, Municipal Electric and Water Department, Washington, N. C.

WHEN the new filtration plant was put into service at Washington, N. C., it was soon found that owing to the amount of alum required to get the proper coagulation, it was necessary to use a very large quantity of soda-ash. This, besides being very expensive, proved difficult to regulate properly.

After going into the problem thoroughly, it was decided to drive a test well on our property to ascertain the advisability of using deep-well water for securing the desired alkalinity. Upon completion of the well, tests showed the alkalinity of the water to run about 300 parts per million, which was very satisfactory. The test well was driven to a depth of 60 feet, and a sufficient quantity of water was obtained.

It was decided to sink five 3-inch wells to furnish an ample supply. These wells were spaced over a rectangular area of about 200 square feet. The casings were all brought to one header and carried to the pump, which is of the triplex pattern, with a capacity of 300 gallons per minute. This was formerly used in our old water plant for pumping from wells, and has proved highly satisfactory in its new location.

The capacity of the filtration plant is one million gallons per day. At present there is a consumption of about 450,000 gallons per day. The alkalinity of the raw water varies from 4 to 5 p. m. Previous to the employment of deep-well water for correcting the deficient alkalinity, alum was used at the rate of 500 pounds per million gallons, and soda ash at the rate of 300 pounds per million gallons. We now use about 300 pounds of alum and no soda ash.

The ideal arrangement for using well water for the correction of deficient alkalinity is to place a meter in the discharge line between the pump and the mixing chamber, and by metering the raw water-supply the alkalinity can be regulated to a nicety. The

amount of well water used is regulated by a gate-valve placed in the suction line to the pump, and is varied in accordance with the results of tests of the filtered water.

It is not the intention of the writer to go into the subject of costs covering the installation of the deep well machinery, or the savings realized by the use of well water for acidity correction, as each case must be worked out according to local conditions and will vary according to nature of soil, freight rates, labor costs, etc. It has been our experience, however, that this method of treatment is far more satisfactory than the soda-ash or other treatments, and the savings have reached as much as \$5 per day, varying, of course, with the price of soda-ash and the quantities used.

The original layout was enlarged a year ago by adding two more wells of the same size, connected to the original suction header. This enlargement was not made on account of a lack of water for correction of deficient alkalinity, but to increase our supply to the point where we could depend upon the wells as an auxiliary to the regular supply in event of the failure of the filtration plant or other cause. We were fully justified in making this additional enlargement by the conditions which presented themselves in less than sixty days after the completion of the work. Being situated on the coast, our water-supply is apt to become brackish upon a continuance of winds from the southeast which carry the tide into the creek from which we obtain our supply. During the period referred to, the prevailing winds from the southeast lasted for about sixty days and caused the surface supply to become very salty, whereupon the well pump was brought into play and furnished our total supply during the whole period.

ACKNOWLEDGMENT.—From a paper presented at the annual meeting of the North Carolina Section of the American Water Works Association.

Milwaukee's New Meter-Repair Shop

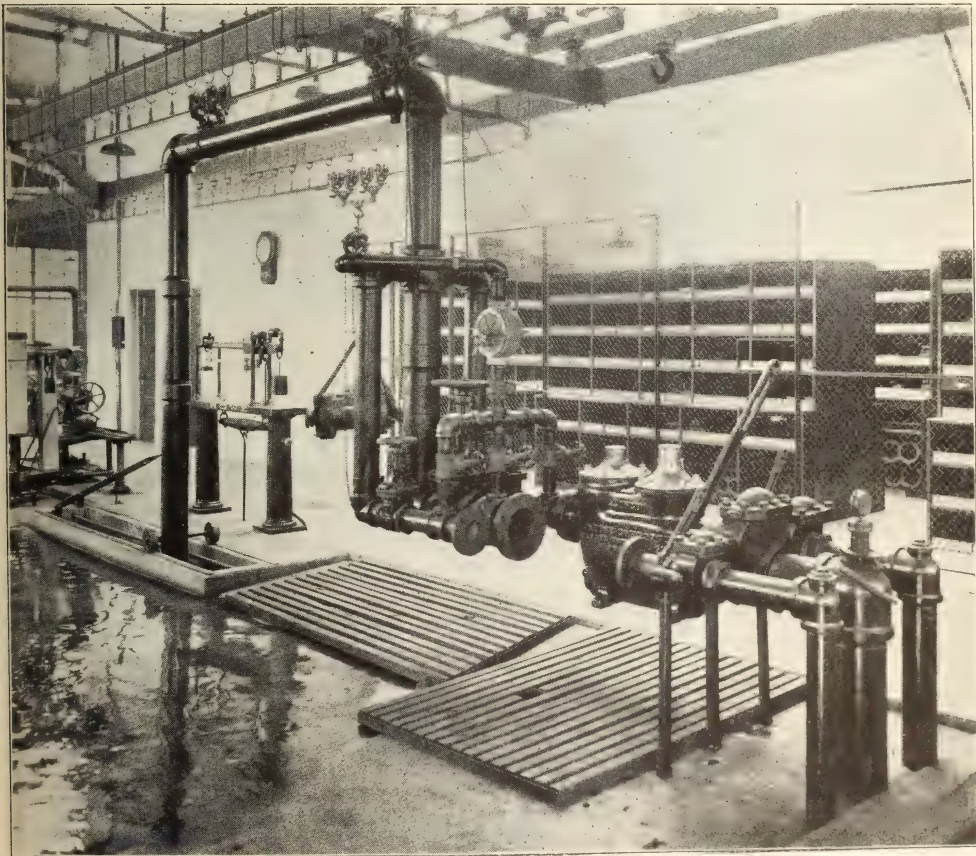
By Frank J. Murphy

Superintendent, Division of Meters, Milwaukee Water-Works

A PARTICULARLY substantial and well-equipped shop building for the maintenance of the city's meter system has recently been erected for the Division of Meters of the Milwaukee Water-Works. This new acquisition represents an investment of \$75,956 for grounds, building, furnishing, and fees for architects and inspectors. The new shop is within one and one-half blocks of the City Hall, and though in a congested business district, its design affords light and ventilation generally obtainable only in less congested districts.

The site selected has an east frontage of 60 feet, with a depth of 120 feet to a paved alley. The building dimensions are 50 by 108 feet with an ell extension at the rear, of 22 by 12 feet. As the building is erected on the north part of the lot, this provides a 10-foot space to the south, and a trucking space at the rear of the building.

The building, a high one-storied and basement building, is of fire-proof construction throughout. The foundation is of concrete and of the "floating" type. The upper structure is steel, with steel roof trusses supporting a roof of long-span



TESTING-BENCH IN MILWAUKEE METER-TESTING LABORATORY

Note stock-room behind wire partitions, also discharge pipes going through slot in floor, and monorail trolley system overhead

Pyrobar type. Acme lime brick curtain walls enclose the steel framework on the sides and rear. The front is red brick with Bedford stone trimmings.

Essential requisites of a meter repair shop are an adequate water-supply and an amply sized sewer system. Milwaukee officials, in designing this shop, provided these requisites in the installation of a 6-inch water-main delivering water under 55 pounds pressure, and the installation of a double line of sewers. One sewer system drains to the public sewer in the alley and serves the plumbing fixtures and the greater portion of the roof drainage. The other sewer, emptying into the public sewer of the street, serves two downspouts and the meter test water discharge. Under this plan no interruption of testing work, or flooding of floors, occurs as a result of emptying a large volume of water from the test tank into a sewer greatly taxed by roof water discharge.

A Well-equipped Stock-Room

At the front is the "surplus stock room," 18 by 46 feet in size. Here, in bins and racks, is the stock of meter parts and materials to replenish the stock-bins of the shop floor stock-room, as well as pipe, fittings, oil, waste, and other materials and supplies of a bulky or heavy nature or for infrequent use. A sidewalk chute facilitates freight deliveries. Three large bins with chute openings from the upper stock-room floor, and with doors opening to the outer basement, serve as receptacles for storage of scrap brass, iron and bronze borings. A stairway leading from the upper stock-room is the only means of entry; the doors from the basement stock-room to the general basement, as well as the scrap material bin doors, are locked and controlled solely by the stock clerk.

Opposite this stock-room is a space 16 feet by 16 feet for an experimental test room. It is the intention to fit this room for experimental tests.

Occupying a space in the central part of the basement is a 10-ton Howe scale with its beam extended to the floor above. Upon this scale has been built a steel tank of 285-cubic-foot capacity, with drain to the sewer. The tank and scales are used for the test of large meters.

Bins and shelving for nipples and meters,

a pipe fitter's bench with vise, a leather washer cutter, ample floor space for general storage, and the heating plant, complete the list of basement equipment and use. At the rear an electric freight elevator of 8,000 pounds capacity equipped with automatic guard gates and a self-stopping device, facilitates the movement of freight between the first floor and the basement, and a stairway adjoining affords additional means of access. Below the driveway on the south, and opening to the basement, is a large storage space for coal and ash.

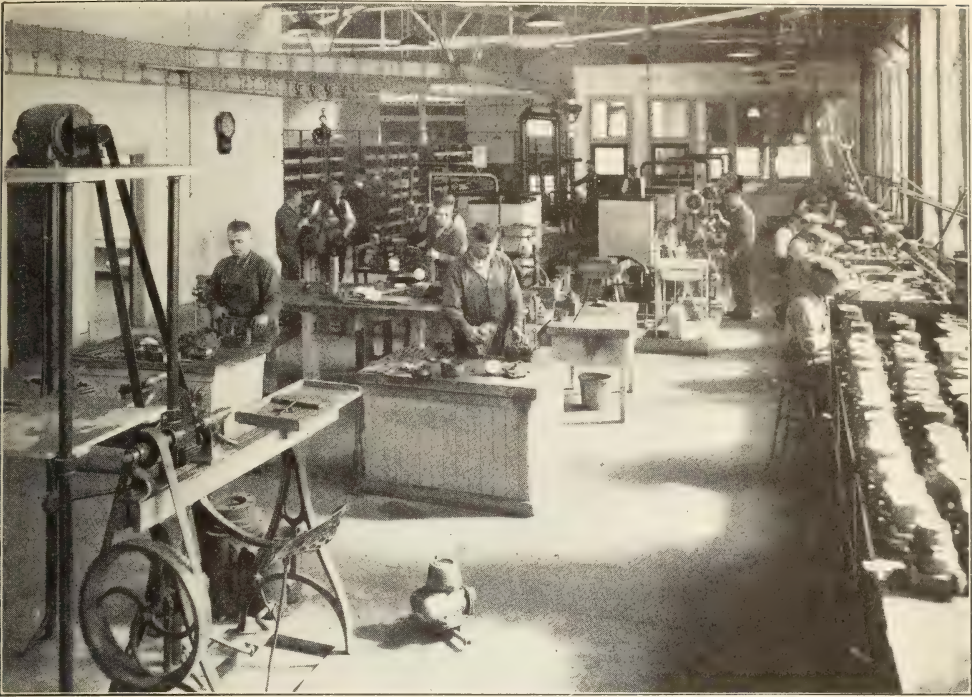
The first floor, a high-storied room measuring 20 feet from floor to roof, contains the repair shop, stock-room, wash and locker room, toilet-room, machine shop, testing rack and shop foreman's office. On the right, extending from the front wall, is the stock-room, 18 by 46 feet, divided from the shop proper by a woven iron wire partition 9 feet in height.

Along the outer wall and in conveniently arranged floor sections with ample aisles, are adjustable steel bins for meter stock, materials and tools. The bins are 7 feet high and have 1,129 compartments. This and the basement stock-room are under the sole supervision of a stock clerk.

The wash and locker room, 14 by 18 feet, has wash sinks with hot and cold water-supply and 22 individual steel lockers. The toilet-room is provided with plumbing fixtures of the most modern design. Between the toilet-room and the machine shop at the rear is a space 18 by 18 feet along the walls of which is a double-tier table, 15 feet long and 3 feet wide, for incoming defective meters, and against the other two walls are 154 bins for Worthington piston meters awaiting machining. These bins and tables, like those of the stock-room, are of adjustable steel construction. The center of this space is utilized by the employees for lunch, a large table having been provided.

The machine shop, 20 by 30 feet in size and occupying the ell of the building, has light from windows on two sides, additional to that from the skylight extending over the bin space. Here, with the equipment of a modern machine shop, is performed the machine work of the division as well as considerable work for other divisions of the water-works.

This machine shop equipment comprises a 24-inch shaper, a 14-inch by 6-foot



REPAIR BENCHES AND SMALL TESTING MACHINES, MILWAUKEE METER-TESTING LABORATORY

Prentice lathe, a 16-inch by 8-foot Rahn and Larmon lathe, a Williams number 2 pipe machine, a Milwaukee drill press, a wet tool grinder, a blacksmith's forge with blower, an anvil and blacksmithing tools. An I-beam trolley of one-ton capacity extends over the shaper and the two lathes for handling heavy work on these machines. Each piece of machinery has its individual electric motor.

In the center rear section are the four Worthington piston meter repair benches, with an 11-inch by 5-foot Blount spud lathe, individual motor drive, and an old foot-power lathe, a relic of the early days of the division. Along the wall is a double-tier adjustable steel table 15 feet 6 inches by 3 feet 3 inches, for meters to be repaired.

Following, and along the south wall, with splendid window light, is a 1¾-inch maple-top work-bench 58 feet long and 2 feet 6 inches wide. Division strips 3 inches high divide the bench into 15 sections. Each section is provided with tool racks at back and a drawer below. Bench vises and removable pounding blocks placed alter-

nately at the dividing strips afford each man the use of a vise and block. Two gas automatic soldering iron heaters, one at the end and the other at the center of the line, are used in making dial repairs.

A Time-Saver

An equipment that has elicited considerable favorable comment is a wire line parcel carrier system between the meter repair bench, just referred to, and the stock-room. The installation of this system, which is a modification of a department store parcel carrier, has been productive of splendid results as a time-saver.

Seven "stations," or carrier basket drops, have been placed along the bench line, each station serving two men, with a like number of "stations" at the stock clerk's desk. As meter repair parts are required, the bench man places his shop order and the defective part in the carrier basket, and, releasing the basket catch by a slight pull of the rope, "shoots" the basket to the stock-room station. The order having been filled and entered on the shop order and the daily record of materials used, the basket is re-

turned to the bench man, who in the meantime has been preparing the meter for the part instead of wasting time traveling to and from the stock-room for the part.

It is a rule of the division that all defective parts must accompany an order for a new part. This not only prevents errors in filling the order, but also assures a complete control of scrap material. On receipt of the defective parts, the material is dropped through the stock-room floor chute to the proper bin in the basement. At the end of the year the scrap is sold.

The shop foreman's office, 11 by 16 feet, is at the front and to the left of the entry hall, and is partitioned from the shop by a fire tile plastered wall. The shop-side partition is plentifully supplied with windows. From the shop office a full view of the shop can be had. File cases carrying an active five-year file of detail repair for each meter are kept here. The shop office and the city hall office of the division are connected by a private and public phone.

The Testing Apparatus

In the center of the shop is the test "rack" or floor. This is a space 33 feet long and 11 feet wide surrounded by a curb wall 6 inches high and 24 inches wide. The floor within these curb walls is pitched to the center to a 4-inch drain leading to a catch-basin in the basement.

On the 24-inch curb wall and across the aisles from the work-benches, are placed six Mueller test tables with Mueller multiple orifice valves, quick-opening supply valves and necessary adapters for testing meters from $\frac{5}{8}$ to 2 inches. Each test table has a 2-inch water-supply and discharges to a 15-cubic foot galvanized iron tank on a scale within the enclosure. The tanks discharge on the floor to the center drain. A sink at each end of the test floor, adjacent to the work-benches, and a hose connection near the Worthington piston meter bench, provide facilities for cleansing meters and for general shop use. Each sink has hot and cold water and bubbler supply.

On the test floor side opposite that occupied by the "small" or Mueller test tables, is the large meter-testing apparatus. This tester was designed and built by the Division of Meters. Of 6-inch pipe construction, the tester is arranged for testing 3-, 4- and 6-inch meters from the full-stream

flow to the 1/16-inch and 1/32-inch streams, and is adjustable to a "spread" from 9 to 102 inches. Three inlets, of 3-, 4- and 6-inch sizes respectively, are controlled by quick-closing lever handle valves and provided with flanges for connection of the meter to be tested.

The outlet end is provided with the same number and sizes of flanged openings with wheel gate-valves for discharge control. Between each flange and each valve a 2-inch pipe, separately valved, is cross-connected to a Mueller multiple orifice valve, the outlet end of which connects to the rising discharge pipe of the tester. The 3- and 4-inch outlet pipes are similarly connected to the same rising discharge. This 6-inch discharge has a rise of 6 feet to a trolley hanger, a horizontal length of 8½ feet, and then drops through a slotted opening, 9 feet in length, in the curb wall to the 285-cubic-foot tank in the basement.

The steel test tank discharge is controlled by a heavy brass drop valve connected to a foot-operated lever with locking device, on the curb wall. A slight foot pressure on the lever raises the valve, and by moving the lever arm sideways slightly, locks "open" in a lever bracket, thus holding the valve open without further attention. The weighing of the tank water is facilitated by the scale beam extended from the 10-ton Howe scale in the basement to the test floor.

A reference was made to the trolley supporting the outlet side of the tester. This is a continuation of a "Lauden trolley" extending from the loading platform to the test floor with safety locking switches, to the larger of the Mueller test tables and to the large meter tester. The trolley track is attached to a 9-inch channel iron beam hung from the trusses, and capable of carrying a load of 2,500 pounds. It is equipped with one 1-ton and one ½-ton trolley for shop use, and two ¼-ton trolleys for the tester outlet. By means of this trolley the tester can be moved with ease to accommodate meters with variation in spread from 9 to 102 inches.

The Crime of Water Waste

Read the crime prevention article, "The Value of Water-Waste Surveys," on pages 465 to 471.

The Mapping of Old Sewers

Procedure Followed by the City Engineer's Office, Hartford, Conn.

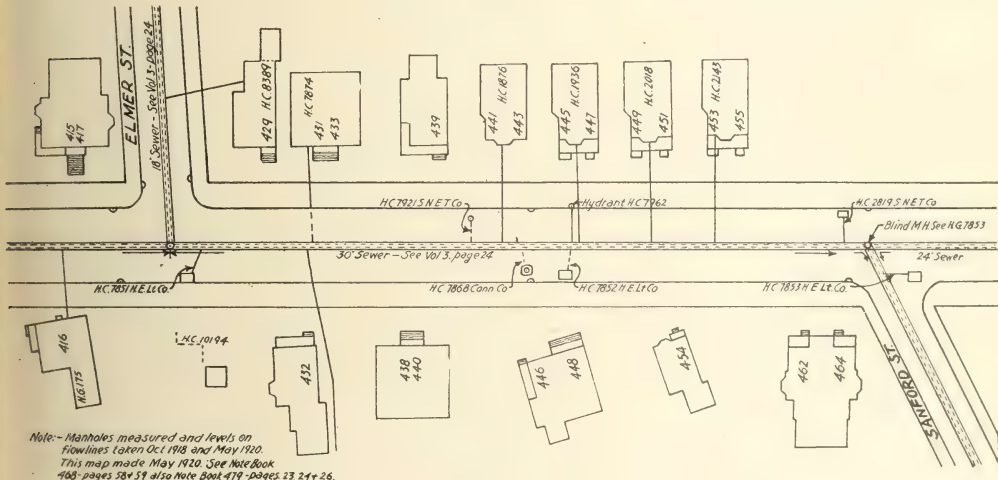
By Willard S. Brewer

Division Engineer in Charge of Sewers, Hartford, Conn.

THE records and plans which were made of some of the early sewers of Hartford at the time they were built and which have come down to us, are quite meager. In 1844, when the first sewer of which we have record was built, and for some time thereafter, a written layout was the only description of the system. As many of the points to which the sewer was referenced have long since disappeared, the location of the sewer itself is known only approximately. Of the sewers built in the

by that much the amount unmapped. In particular, the reconstruction of the sewers in the older business part of the city, near the Connecticut River, as a part of a scheme to relieve this section from flooding by spring freshets in the river, was carried out between 1911 and 1914 and replaced over two miles of these, the oldest sewers in the city. In 1918, out of a total sewer mileage of 150, there were nearly 30 miles with either no maps or very poor maps.

With the regular construction work in



A SECTION OF THE NEW SEWER MAP OF HARTFORD, CONN.

'50's and '60's we have profiles of a large portion—presumably made at the time of construction, although there is no date on them to attest this. There is a bound book of mounted maps, and the earliest date showing is 1873. From their appearance it is evident that these plans were made primarily for purposes of assessing the cost of the sewers, as most are on a scale of 100 feet to 1 inch and have few figures which would give even a fair location of the sewer.

Previous to 1918 very little work had been done towards providing maps of these old sewers, although of course the occasional reconstruction of a sewer cut down

progress, and with the men and money available, it had been possible only to keep up with current work in the matter of mapping. However, with the slowing up of large construction work in 1918, it was possible to turn our attention to this neglected part of the work of a city engineer's office, and during the intervening four years about 16 miles have been mapped. The result, of course, is in many cases only an approximate location of the sewer, but it represents all the information it has been possible to obtain. Nearly all of the office work and some of the field work have been done in the winter, but advantage has been taken of any time available in the open

season to do all field work possible. It was decided also to locate all catch-basins at the same time that the sewer manholes were located.

Field Work Procedure

The procedure in the field work has generally been as follows: First, in the office, from such maps and profiles as are available, make a sketch or notation in the field book, giving approximate location of sewer and where manholes are to be found. Oftentimes it was unnecessary to do this, as the chief of party would know of the location of the sewer and of existing manholes. Once on the ground, however, it was the duty of one man, and sometimes two, to walk through the street in order that no manholes should be missed. At intersecting streets, manholes and catch-basins were referenced either to curbs or to the city highway bounds. At the centers of blocks they were quite generally located from curbs transversely, and longitudinally from the faces of houses extended. Levels were taken on the tops of the manhole castings, and the depth of the flow line and the crown of all inlets and outlets were determined. The difference between the flow line depth and the crown depth of course gave the height of the sewer. Most of the old manholes have no ladder, and quite a large proportion are too small for a man to descend. In these cases it was possible to measure the width of the oval and egg-shaped sewers by fastening an ordinary collapsible rule to a level rod and lowering it down the sewer reading it by the help of sunlight reflected down the manhole by a mirror. Where possible, a man descended the manholes, both for the purpose of measuring the sewer and of inspecting the condition of the sewer by the use of sunlight reflected by mirrors.

Office Work

In the office the first thing done was to obtain a street plan, that is, a plan showing street lines, curbs, property lines and houses. This was obtained from our street plans on file in the office, which in most cases are on mounted drawing paper, to a scale of 1 inch to 40 feet. Our standard record sewer plan for all new construction is a mounted sheet 20 by 30 inches, containing both plan and profile. At first the old sewers were mapped on these sheets, but

later tracing linen was used, as the street plan could be obtained by tracing directly instead of by transferring by the use of a paper tracing, carboned, resulting in very much less work. A profile of the street surface obtained from our office profile is then put on this sheet. The results of the field work are then plotted on plan and profile.

Next, our record of the house connections which have been built at various times from the sewer to the houses is gone through and the locations of the house connection and of the main sewer are plotted; depths are also put on the profile. As this, in many cases, is our greatest source of information, a word of explanation concerning the method of laying and recording house connections may be of value.

Beginning in 1903, all connections to the sewers have been laid by so-called "licensed drain layers," who are private contractors licensed by the city to do this work and are under bond to the city. The drain layer takes out a permit for each job he undertakes, and notifies this office when he is ready to lay pipe, whereupon an inspector goes out, inspects the drain and gets the location of it. If the main sewer is an old one of which we have no location or only a poor location, it is located also, and a depth is taken from the street surface. All this information is plotted on the back of the permit stub, and an index card is made out and placed in the house connection index under the street name. Thus, when mapping these old sewers, by referring to the house connection index we not only are able to plot the house connections made since 1903, but obtain considerable information concerning the main sewer.

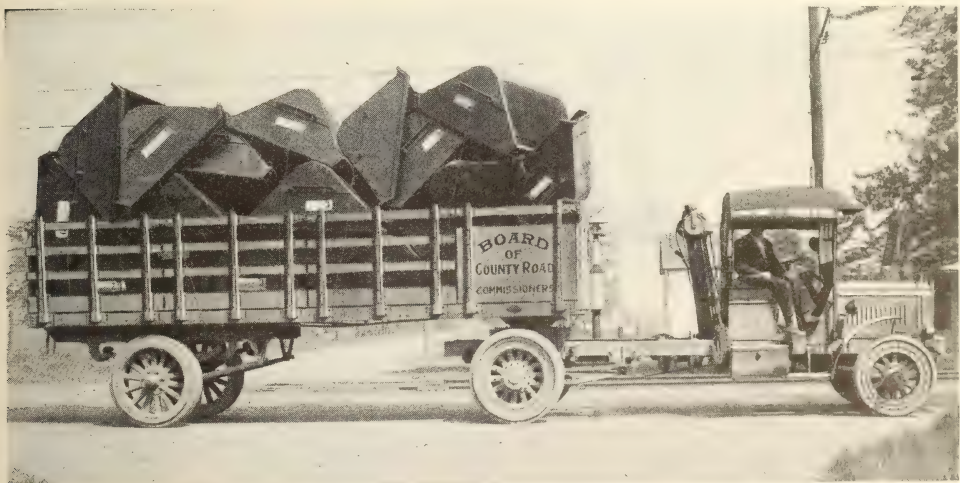
The next step is to compare this plan as made up from actual measurements on main sewer and house connections with such written layouts, plans and profiles as may be on file in the office. This latter material as a general rule does not help very much as far as location goes, but it is of great help in determining the correct grade, and sometimes is the only data available for hundreds or thousands of feet. For instance, in Asylum Avenue, one of the older residential streets, there is a brick sewer built in 1865 with not a manhole showing for a distance of 2,700 feet. There was no plan of the sewer, and as nearly all the houses were quite old, it was possible

to obtain only an approximate location. But a profile (presumably made at the time the sewer was built) was in existence, and this was used in making up the profile of the sewer on the new map. The results of actual levels at manholes at times agree with the written layout or old profile, and at other times do not agree, but it is apparent that any discrepancies are due to inaccuracies in bench mark elevations.

Last winter a rather novel method was used to locate an outlet sewer 20 inches in diameter which ran across about a mile of meadow and marsh land at depths of from 1 to 8 feet below the surface. This sewer discharges into the Connecticut River and at times of freshet in the river the meadow is entirely under water. The sewer was therefore built of cast iron pipe and is without manholes for the entire length. There was a plan and profile in the office. The plan, scale 100 feet to 1 inch, showed the line of the sewer, which consisted of two tangents connected by a curve 800 feet long of a radius of 1,739 feet, also property lines and several brooks. As there is very little on the ground to show where the property lines are, it would have been a difficult task to locate this sewer if the occasion had arisen, and it was therefore decided to go out on the ground and find the sewer by means of augur borings. The augur used was an ordinary 1½-inch wood augur with the shank welded to a piece of iron, which in turn was threaded into a 5-foot piece of 7⁄8-inch galvanized iron pipe,

with a cross-piece at the end to turn with. Short pieces of pipe can be added so as to increase the length for use in deeper cuts.

The location of the sewer at the city end of the meadow was shown by a manhole. A scaled location from a boundary stone and another from a small bridge across one of the brooks gave a trial location for a point about 1,000 feet out in the meadow, this point being selected because the sewer was only 3 feet deep. Borings were begun at this latter point and continued at intervals of about 18 inches on a line normal to the sewer. The augur could be worked through the clay and river silt of this meadow land very quickly, and in the course of about two hours after making several holes the sewer was found. Several intermediate points were tried and the sewer was easily located. By prolonging the line thus obtained out across the meadow, the augur could be spotted very close to the correct location. When the curve was reached, allowance was of course made for the amount of deflection. The sewer was located in this manner at intervals of from 200 to 300 feet all the way to the river, and levels were taken at each point. It was referenced at several places to the city line boundary stones, and in addition five wooden posts were set to act as markers, the lower ends being anchored to prevent their being floated when the river is at freshet level. All this information is shown on a 100-scale tracing, so that the sewer can be staked quickly whenever needed.



MOTOR TRAILERS MAKE QUICK TRANSPORTATION AN EASY MATTER

What Is the Proper Term for Water-Works Bonds?

By Charles W. Sherman

Metcalf & Eddy, Consulting Engineers, Boston, Mass.

THE reasonable period or term of a bond is intimately connected with the life of the property covered by the bond. It is also related to the depreciation or loss in value of the property. The two items of term and amount of bonds cannot be separated in a discussion of the proper or reasonable length of term of bonds.

It is self-evident that bonds on a water-works property, like a mortgage on residence property, should be amply secured; that is, the bondholder should know that the value of the property is sufficient at all times to cover the loan and to repay it at maturity.

Life of a Water-Works Plant

If a water-works plant were like the "One Hoss Shay," which, at the end of its life, went to pieces,

"All at once and nothing first,
Just as bubbles do when they burst,"

and could be depended upon to render service until that time, bonds might be issued against it for the term of its life, but with provision for a sinking fund to repay the loan at maturity, since the property would then have only a junk value. or, what is similar in many ways, with serial maturity of bonds for repayment of principal.

But a water-works is a complex plant, made up of many items having widely different expectancies of life; and in growing towns it is continually being added to, so that the distribution system, for instance, consists of many parts varying in age from less than one year to the age of the oldest parts of the plant. In this country we have instances of cast iron pipe 75 years old and still in service; but the average age of the distribution system containing these pipes is likely to be less than 20 years, because so large a proportion of the system has been added in recent years.

In a paper* by Metcalf, Kuichling and Hawley, presented to the American Water Works Association in 1911, they gave the percentages of the total values of a large number of water-works plants, represented by the principal parts of such works. Averaging the figures presented, I find that the value of the "typical" water-works, based upon these particular statistics, is divided as follows:

	Per Cent
Land and water rights.....	6
Water-supply works	9
Pumping works	17
Distribution reservoirs	6
Purification works	11
Distribution pipe system.....	51
	<hr/> 100

The useful life of these several parts, from the point of view here under discussion, may be taken approximately as:

150 years for land and water rights
75 years for water-supply works
30 years for pumping works
40 years for distributing reservoirs (including stand-pipes)
25 years for purification works
50 years for distribution system (including services and meters)

Then the average life of the entire system will be 51½ years, or, in round numbers, 50 years. The United States Census Bureau "Uniform Accounts for Systems of Water Supply" (1911) states: "Until further study and experience or a series of inspections and appraisals at fixed intervals furnish more accurate data, the average life of the various parts of the fixed properties of a water-supply enterprise may be assumed to be approximately as follows: for horses, carriages, automobiles, and laboratory apparatus and appliances, 10 years; water meters, service pipes, office furniture and general operating equipment, 15 years; boilers, steam pipes, and filtration equipment, 20 years; engines, pumping machinery, and wood pipes, 25 years; masonry of filtration plant, cribs, iron water pipes, intakes and connections, fire hydrants, stand-pipes, and buildings, 50 years; reservoirs,

* "Some Fundamental Considerations in the Determination of a Reasonable Return for Public Fire Hydrant Service," by Leonard Metcalf, Emil Kuichling and William C. Hawley.—Proceedings American Water Works Association, 1911, p. 55.

tunnels, and aqueducts, 100 years; and for the water-supply system as a whole, 50 years. All these approximations are subject to modification by reason of any unusual conditions which may shorten or prolong the life estimated above."

The Committee on Depreciation, of the American Water Works Association, in its final report**, suggests:

For storage reservoirs, dams, and large aqueducts	75 to 150 years
For cast iron pipe of large diameter.....	75 to 125 years
For cast iron distribution pipe.....	30 to 90 years
For wrought iron distribution pipe.....	25 to 40 years
For services	15 to 80 years
For distributing reservoirs	50 to 75 years
For stand-pipes	30 to 60 years
For meters	20 to 30 years
For pumping machinery	15 to 60 years
For boilers	15 to 30 years
For filter plants	15 to 50 years
For buildings	20 to 60 years

The average figure of 50 years' life for a "typical" water-works plant is of no direct use, since it presupposes that all items of the plant are new at the same time, and that no renewals are necessary. Starting with an entirely new plant, of the "typical" character assumed, it does represent the average expectancy of life; if no extensions are required after 5 years, the remaining life will be 45 years, but if extensions have been required, the average remaining life may be 46 years or more. The remaining life of the plant does not decrease uniformly from 50 years to 0, since the effect of extensions and replacements which add new elements to the plant at frequent intervals is to reduce progressively the rate at which the remaining life decreases. Indeed, after a time the remaining expectancy of life no longer decreases, but remains substantially constant.

Average Remaining Life Is Proper Term for Bonds

The average expectancy of life remaining after it no longer decreases is then a suitable term for which bonds may be issued in the case of the assumed typical plant. This remaining life of the plant will be the same now, next year, and five years from now. This statement is not precise in its application to any particular works, but is nearly so with any growing plant, or even in one whose growth has ceased, provided that replacements and renewals are made as they become necessary. That is

to say, the effect of the long life ahead of new plant added for renewals and extensions will, on the average, offset the lesser remaining life of the old plant due to increasing age. In practise, the expectancy of future life generally decreases gradually during a term of years, while only minor extensions and renewals are made, and then increases abruptly when important additions to plant are made; the average result corresponding to a relatively uniform expectancy of life.

Determination of Remaining Life

The average remaining life expected is rarely estimated or stated in reports of valuations. The amount of the accrued depreciation upon existing plant is, however, practically always stated, and its ratio to the reproduction cost (or original cost) of existing plant is easily obtained. The relation between accrued depreciation and elapsed proportion of the total life is a direct one; and if the average total life can be taken as a constant, say 50 years, the remaining life follows directly.

For this estimation the total accrued depreciation, including that on abandoned structures, should be used, and compared with the total cost, including that of the same abandoned structures. The figures should be based upon complete records for works of a considerable age, not less than 20 years; figures for works of which the record of abandoned structures is lacking or incomplete are less satisfactory and require some adjustment before being used.

A sufficient number of complete records, covering both large and small works, automatically includes the normal percentage of complete depreciation, due to accident, obsolescence, or other causes resulting in less than the usual life for some structures, and the figures obtained from these records furnish a basis for approximate adjustment of data covering only the depreciation of existing plant.

In a paper entitled "Practical Checks upon Water Works Depreciation Estimates,"* Leonard Metcalf has submitted a table of "Depreciation Records of Some Old Water Works," which contains 11 such complete records; and other data not included in the published paper bring the

**Journal American Water Works Association, 1919, p. 85.

*Journal American Water Works Association, 1919, p. 371.

number to 13. The total accrued depreciation in these 13 cases averages 19.7 per cent, the range being from 7.2 to 27.0 per cent. Omitting the lowest record as abnormal, in view of its divergence from the others, as well as the known circumstances making for a low depreciation, the range is from 13.3 to 27.0 per cent, and the average 20.7 per cent.

Assuming that depreciation accrues on the basis of a geometrical progression, corresponding to the growth of a sinking fund earning 4 per cent interest, a total accrued depreciation of 20.7 per cent on a plant of 50 years' total life, corresponds to an age of 20 years, and a remaining life of 30 years.* The range of depreciation from 13.3 to 27.0 per cent corresponds to remaining life of 36 to 26 years.

On the basis of these figures, the conclusion is obvious that under normal circumstances the fair term for water-works bonds is 30 years, and that in individual cases it should seldom be less than 25 or more than 35 years.

Residual Value

These same figures of accrued depreciation indicate that there is still remaining in normal works a value of approximately 80 per cent of their cost, the range being from 73 to 87 per cent. The figures given have been based upon reproduction rather than original, or actual, cost, but the proportions would differ but slightly, if at all, if figures of actual cost had been used.

In references to cost or value in this paper the physical plant, only, is meant. Items of value not represented by the plant are omitted from consideration as having no bearing upon life of the property, or upon the part of the value which may properly be covered by bonds.

*NOTE.—If the average total life were 60 years, the remaining life corresponding to 20 per cent depreciation would be 33 years; and for a 70-year total life, the remaining life would be 35 years.

An examination of the records of accrued depreciation for a large number of other water-works, mainly those for which there is no record of abandoned property, indicates that the above figures are conservative. After adding reasonable allowance for the effect of abandoned property, there seems to be a decided majority of plants in which the accrued depreciation is less than 20 per cent, and but few in which this figure is materially exceeded.

Reasonable Term for, and Amount of, Water-Works Bonds

It therefore appears that the fair or reasonable term for water-works bonds is 30 years, and that 80 per cent of the cost may be covered by bonds, which will be suitably secured by the property covered.* Under exceptional circumstances the term may be reduced to 25 years, and the percentage of cost to be covered by bonds to 75.

In the case of bonds of municipal works, the property is not the sole security for the bonds, as the credit of the municipality is pledged. The bondholder is therefore suitably safeguarded even if the entire cost of works be raised by bonds. Indeed, such procedure is usually the only one possible in the case of new works, and is justified by the fact that the anticipated life of the works at that time is 50 years or more; but in the case of enlargements or extensions it is certainly a fact that conservative financing would require that such works be self-supporting and that neither the amount nor term of bonds be greater than would be proper in case of private corporation ownership.

*This statement must not be taken to mean that it would be good corporate financing to issue bonds to the extent of 80 per cent of its physical property; nor that items of intangible property should be omitted from capitalization.

ACKNOWLEDGMENT.—From a paper read before the New England Water Works Association, December, 1922.

When Bathtubs Were Considered a Menace

When bathtubs were first installed in the United States in the forties, the papers attacked them as extravagant and undemocratic and the doctors denounced them as dangerous to health. As usual, government was called upon to restrict or suppress the novelty by special taxes and licenses. In 1843 Virginia put a tax of \$30 a year on bathtubs, and in 1845 a Boston municipal ordinance made such bathing unlawful except on medical advice.

—*Science Service.*

Highway Routes in the New York Metropolitan District

By Harold M. Lewis

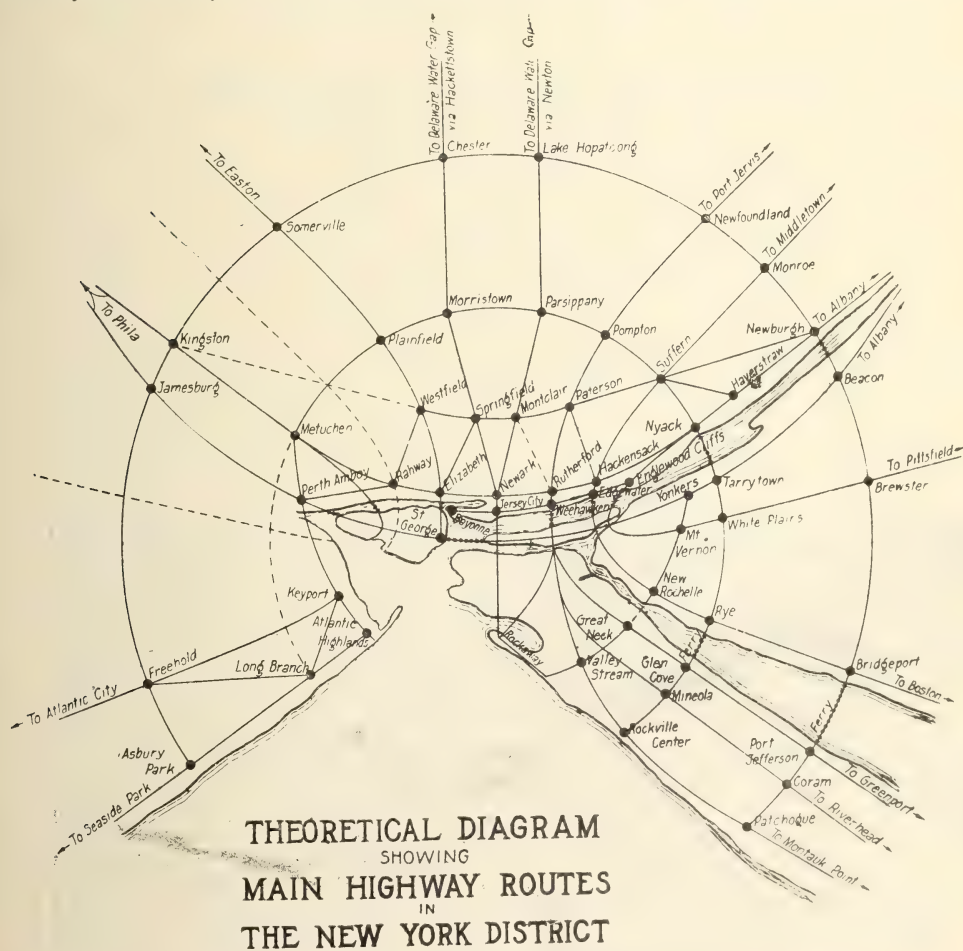
Of the Physical Survey, Plan of New York and Its Environs

ANYONE who has tried to thread his way by automobile from one point to another of the congested areas around New York City has gained some realization of the physical impediments to a systematic highway plan for this entire district. There is probably no other large metropolitan area that is so cut up by rivers, arms of the sea and mountain ranges.

Among the preliminary studies being made by the recently announced Committee

on Plan of New York and Its Environs, the existing highway facilities have received considerable attention. The accompanying drawing shows what already exists that might be made part of a diagrammatic layout, and brings out rather clearly the general problem of highway distribution through the city and its environs.

An outer circumferential route actually exists, extending from Patchogue on the south shore of Long Island across the



April 1922

Full Lines show general location of existing roads
Broken Lines show direct connections which may be supplied
in the future

Sound to Bridgeport, crossing the Hudson at Newburgh and swinging through Monroe, Lake Hopatcong, Somerville, Kingston and Freehold to Asbury Park. There are well-improved roads throughout all this route; and while there are considerable irregularities in direction, the basis is there for a well-defined enveloping highway passing outside of all the congested areas and mostly through country of great natural beauty.

An inner circumferential road starting at Rockville Center passes through about the outer limits of the ordinary commuting zones, crosses the Hudson at Nyack, passes through Suffern, Morristown and Plainfield, and ends at Atlantic Highlands or Long Branch on the Jersey coast.

The main axis follows the Albany Post Road, crosses Staten Island and leads to

Philadelphia via Jamesburg. A subsidiary axis passes down the west shore of the Hudson River and also leads to Philadelphia via the Lincoln Highway. A series of three parabolas on the north with additional lines on Long Island indicate the main routes in this part of the area, and a considerable part of a similar system already exists in the southern part of the district.

Through the agency of the Port of New York Authority, steps are being taken to simplify the entry of rail traffic into the city and the diversion of through traffic around the congested points. A similar treatment of the highway traffic problem will be necessary to relieve the congestion within New York City, Newark and Jersey City. This is one of the most important problems being studied by the Committee on Plan of New York and Its Environs.

Advertising Signs Removed from State Highways

By John D. Williams

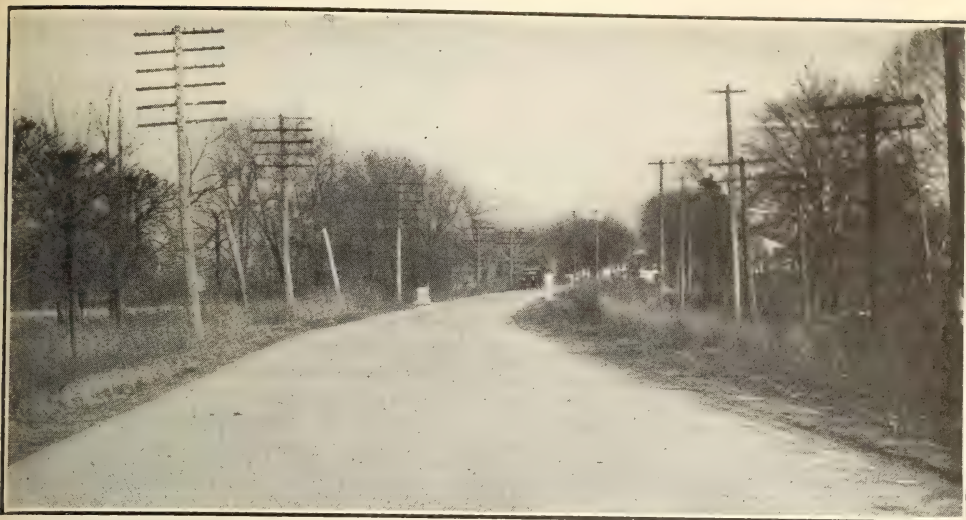
Director, Indiana State Highway Commission

TRAVELERS on Indiana state highways are impressed with the absence of advertising signs that formerly cluttered the roadside within rights of way and very frequently obstructed sight dis-

tances at curves and road intersections to the degree of menacing traffic safety. Today, through the action of the State Highway Commission, approximately 4,000 miles in the Indiana state highway system are



A VIEW OF AN INDIANA STATE HIGHWAY BEFORE ADVERTISING SIGNS WERE REMOVED



NATIONAL ROAD WEST OF INDIANAPOLIS, SHOWING THE RESULT OF THE INDIANA HIGHWAY COMMISSION'S REMOVING ADVERTISING SIGNS FROM WITHIN RIGHT OF WAY

free of such signs, and accidents on Hoosier state roads have been reduced to a minimum.

Prior to the action of the Commission, enthusiastic tradespeople had been placing signs at the most advantageous places, which in many instances were at dangerous crossings and sharp turns where motorists are forced to slow down. The result was that as many as twenty big signs were crowded into a small area, and in some instances view of the road ahead was impossible. Lack of sufficient sight distances, which the Commission holds must be at least 300 feet in both directions on curves, made accidents inevitable. The signs also entailed much unnecessary work when cutting weeds with mowers, opening drainage ditches and the like. For these reasons the removal of some of the signs was necessitated, while others which did not interfere with work or traffic were allowed to remain. This called forth protests from owners, who charged discrimination.

These conditions resulted in an order by the Commission that all signs of publicity nature must go within the rights of way on state roads. In order to work no hardship on anyone and to give owners of expensive signs time in which to remove them if they so desired, the Commission allowed one year for this work. At the expiration of twelve months, crews were sent out by the maintenance department and removed more than

one million signs, chiefly placards tacked to fences and trees, and small signs erected on telephone and telegraph poles.

In only a few instances was the Commission's order resented to the extent that, when signs were torn down, tradesmen again erected them. In such cases, after the signs were removed for the second time by the highway department, no further effort was made to replace them.

Removal of the advertising signs developed the fact that this form of publicity was used principally by small dealers who spend little money in printer's ink. This class were the chief protestants against the order. Larger firms have cooperated with the Commission to clear roads of signs, taking the position that, in this age of greatly augmented motor traffic and higher speed of travel, roadside advertising is obsolete and that newspapers and magazines are the most profitable mediums for stimulation of trade.

The only signs now permitted on Indiana roads under jurisdiction of the State Highway Commission are those erected by the department, calling attention to the number of the road, dangerous cross-roads, grade crossings, steep hills, narrow stretches, etc., and similar warning signs put up by motor clubs cooperating with the Indiana Commission to make safer automotive travel in this commonwealth.

Taxes versus Improvements in Relation to Street Lighting

By Charles J. Stahl

IN almost any city or village throughout the country there are those who claim that the present rate of taxation is too high. A discussion of the subject usually leads to comparisons between past and present rates, on which basis it is, of course, plain that taxes are higher, and in most communities are going to be still higher. Further thought on the subject soon leads to the conclusion that we should not judge by the old standards and that we must expect advanced rates or diminishing services at the old rate, when the purchasing power of the dollar grows less. None of us, however, are satisfied to accept diminishing services from the state, county and municipal administrations; in fact, quite the reverse is true, for, as our plane of living advances, governmental operations must adjust themselves and advance accordingly. The traffic squad is an added expense, but no one advocates its elimination under the present intensive use of automobiles.

Some point to the fact that the purchasing power of the dollar has advanced somewhat during the last two years, but, on the other hand, it is quite plain that taxation has been allowed to lag far behind actual requirements. This was particularly true during the war period, when domestic expenditures were curtailed and local benefits sacrificed in order to participate to the fullest extent in operations abroad. Then the administrations immediately following the war encountered a period of downward trend in prices and a delay in the resumption of normal activities, so they not only hesitated to enlarge community expenditures but allowed taxation to lag, and in many cases they passed on to this day some substantial deficits as well as inadequate tax rates.

The foregoing remarks have a bearing on the subject of this article because present advocates of more and better street lighting constantly encounter objectors who insist that nothing should be done, that their tax rate is already too high, that an increase is preposterous, and that a decrease

must in some manner be brought about.

The Bugaboo of Tax Rates

Recently in a Council meeting of a town of about 2,000 population there was a lengthy discussion on why the town should not pave its main street full width from gutter to gutter. A state road, laid out to go through the main street of the town, was to be paved for a width of about 24 feet, which within the town would leave at least 10 feet of dirt at each side between the paving and the curb. Although the complete job could be done best and on a most economical basis right along with the state's or counties' construction, it was argued that taxes were already too high and that if they should be allowed to advance further it would become impossible to induce new citizens and commercial enterprises to locate in their community. It seemed to be taken for granted that anyone seeking a new location would be more concerned about the tax rate than the inducements the community offered in the way of public improvements and the display of progressive spirit—but imagine what sort of merchant would choose for a new location a town having for its main street a "through" strip of paving with 10 feet of dirt, often mud, on both sides. "Strictly a 'no-stop' town" would be the progressive merchant's diagnosis, and his investigation would not extend to the point of inquiring about the tax rate.

It is not the purpose of this article to advocate high taxes but rather to accept what tax rate becomes necessary in order not to fall far behind in public improvements. No doubt some people are drawn to a community having a reputation for low tax rates. Like attracts like: in other words, the community that is saving, above all else attracts the man whose main ambition is to save.

Business men embarking on new ventures, however, will look first of all for a progressive city. It is true that they may inquire as to the tax rate and, if it is low

and the other qualifications are present in fair measure, so much the better. But when it comes to choosing between a city of low tax rate and subnormal public improvements as against a progressive and thoroughly modernized city with a higher tax rate, they invariably choose the latter, for taxes, after all, are a small item in operating costs, and the characteristics of the community are of utmost importance.

Street Lighting and Safety

Let no merchant whose shop faces on a poorly lighted street persuade himself that this is a small matter, even if he does close his doors at nightfall! People learn to avoid his street at night, and they unconsciously obey the same instinct in daylight.

Let no citizen whose community still does without modern street lighting believe that such denial is in the interests of true civic economy, for the well-lighted towns are the well-linked towns, and the real gains in values and business that follow the installation of modern street lighting equipment offset its costs many times over.

And what about the benefits that modern street lighting brings to all the people

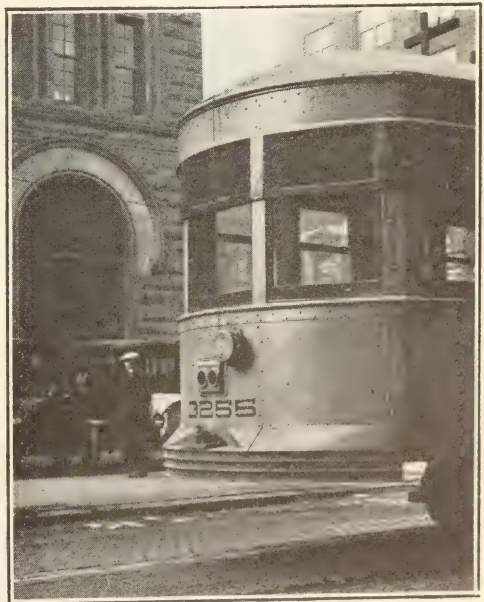
in a community? It means safety for women and children who must traverse the streets alone after nightfall; the prevention of many painful and costly accidents; the enhancement of property values and the betterment of living conditions.

Does the highwayman select a well-lighted street for his operations? There is more for the overworked policeman to do in one poorly lighted block than in four that are properly illuminated.

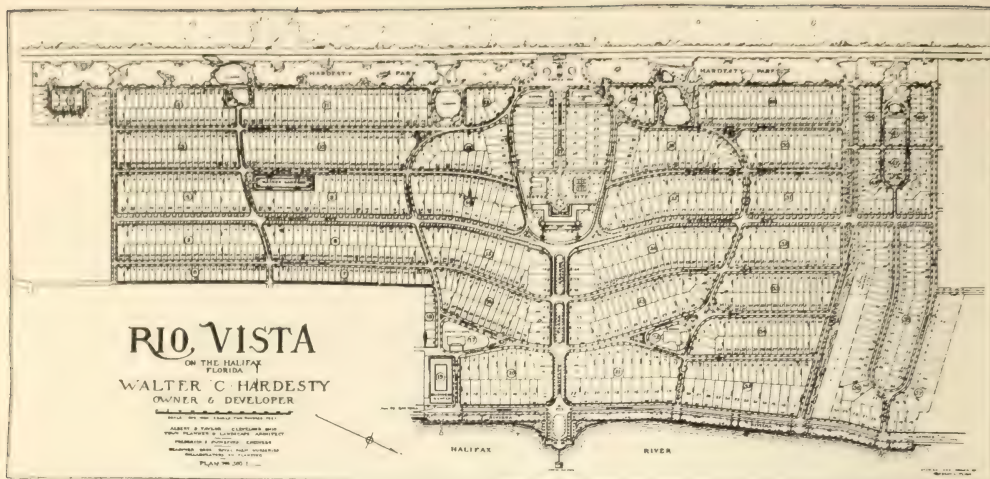
Ornamental street lighting does more towards modernizing and enhancing the appearance of a community than any other improvement of equal cost. An ornamental street lighting installation works 24 hours per day, for if properly selected it improves the appearance of the street by day as well as by night. It beautifies the city, develops civic pride and makes knockers boosters. The feeling of safety and cheerfulness alone are worth the cost, and, after all, the best thing we do on this earth is to build good homes for our families. In our home and home town we derive our greatest satisfaction, and no town having once experienced the benefits of good street lighting is ever satisfied with less.

A New Safety Measure

A NEW safety measure is now being applied in Detroit by the installation on street cars of "Stop" lights similar to those commonly used on automobiles. These give ample warning to cars or automobiles following that the street car is about to stop, or at least is slowing down for some reason. This practically eliminates the danger of a second car's crashing into the first, or of some auto driver's failing to see that the car is stopping, in time to avoid striking a passenger who is alighting. As shown in the illustration, the "Stop" light is built into the rear of the car and consists of two lights side by side, one of which is red and the other green. When the car is moving forward the green light burns, but when the power is turned off or the brakes are applied, the green light goes out and the red one burns as long as the car stops. When it again starts forward, the process is reversed, the red light going out and the green one coming on.



"STOP" LIGHT ON DETROIT STREET CAR



A New Town in Florida

By A. D. Taylor

Landscape Architect and Town Planner

FLORIDA is the nearest available winter playground and refuge from cold weather for over half the population of the United States. It is certain to continue to grow. Therefore when development of Rio Vista was considered it was decided to make a thorough study for a permanent town which should increase in beauty with its growth. The accompanying plan was the outcome.

Situated on the Halifax River, on the East Coast and between the established home communities of Daytona and Ormond, a residence town is called for with merely local business facilities. The 400-acre tract lies $1\frac{1}{2}$ miles along the Florida East Coast Railroad and nearly a mile along the river. The topography shows a slope from the river up to a ridge 23 feet high occupied by Ridgewood Avenue and descending toward the railroad to the west. Ridgewood is the extension of the finest residence avenue of Daytona. A hotel is the central feature in a tourist residence town. This is placed on the ridge at the cross axis, with a natural point in the river bank for eastern terminus, and the railroad plaza as the western terminus of the central motif.

The area between Ridgewood Avenue and the river has natural high value. In

order to raise the selling value of the area behind the ridge near the railroad, 10 per cent of the property, or 40 acres, was devoted to wooded park with natural lagoons and with fine tree growth preserved as screen for the houses fronting this park. It also presents a most inviting aspect to passing travelers, who have been accustomed all through Florida to see from the train the rear quarters of negro colonies.

The other main attractive features are those of the superb water-front, which, instead of having filled lots between the Dixie Highway and the water, will be a palm-planted esplanade of exceptional possibilities. An existing canal near the north is used as the reason for a parkway connecting the water-front and the large park, thus giving park circulation and an organization to the plan.

The street system is just enough off the gridiron to appear to be curvilinear, without the confusion of a full curvilinear system. The curved disappearance of the avenues in perspective and the curved cross-streets are enough to accomplish this. The spacing of the avenues is such as to secure lots varying from 120 to 170 feet in depth, and from 50 feet front to 120 feet, with a proportion of bungalow lots 65 by 85 feet. The curved streets allow lots fac-

ing all points of the compass. A church and a school site are so worked in as to help the symmetry of the plan without losing efficiency, and a business center on Dixie Highway in the form of a hollow square, presenting an attractive front on all sides, helps rather than harms the town. Shops are also planned on the Station Plaza.

This entire development is a straight business proposition, and the owner sees definite cash return in departing from the engineers' gridiron plan and giving up salable area to purposes of beautification. He also knows that the construction cost is lessened rather than increased by careful plan-

ning at the start, and that speedier sales and higher values are his reward.

The development work at Rio Vista is moving forward rapidly. The erection of a casino of Spanish design has been completed. A riding academy, a bath-house and five residences are now under construction. The Plaza Grande has been graded and trees have been planted its entire length and also the entire length of the Dixie Highway and on all the other streets. Part of the White Way system is already in illumination. The laying of rock for the foundation of streets is progressing rapidly and the city of Rio Vista is fast becoming an actuality.

A Sign Which Prevents Accidents at a New Jersey Turnpike Intersection

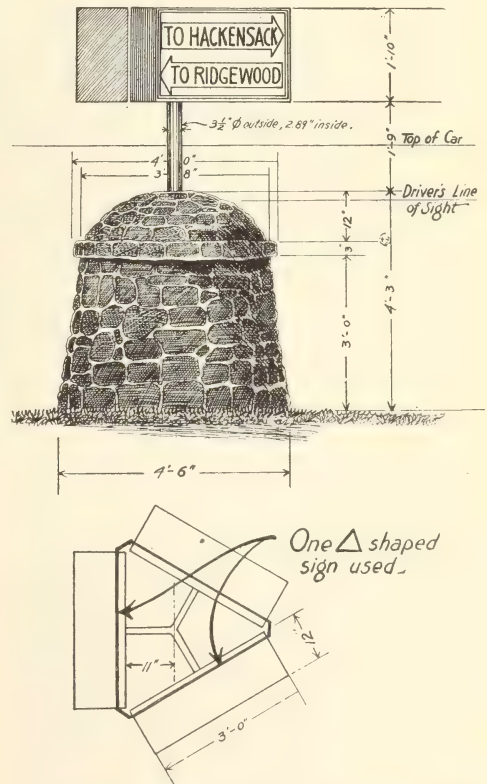
By Roscoe Parke McClave

County Engineer, Bergen County, New Jersey

THE intersection of the Franklin Turnpike and the road leading to Paterson, N. J., over the Saddle River, is dangerous, because the greater amount of traffic going through Bergen County and bound for New York State travels over the Franklin Turnpike, and there is more or less confusion when the autoist comes to this point. The county of Bergen, realizing this, first provided a triangular wooden sign, giving the directions to the various points.

This sign gave the information desired, but the intersection itself was not large enough to permit free and convenient travel for the traffic going in the various directions. The intersection was then widened, and the new sign that was placed there contained the same direction information given on the first sign. This second sign is considered an improvement on the old wooden one. It is made of glass and illuminated from within, and is placed at a lower level, so that the motorist can more easily observe the road and read the sign, day or night.

At least 20,000 cars have passed the sign in one day, and, in a great many instances, the drivers are strangers looking for direction. It has served its purpose by eliminating confusion and accidents at this important Bergen County intersection.



ELEVATION AND PLAN OF FRANKLIN TURNPIKE SIGN

Sending Fire Apparatus to Neighboring Towns

DO you send apparatus on call to adjacent towns? If so, under what arrangements?

These two questions were asked by THE AMERICAN CITY recently in a letter to a typical list of fire chiefs in cities large and small throughout the United States. Of the 304 responses received, 237 answered "yes" and 67 answered "no" to the first inquiry. An analysis of the replies shows that most of the negative replies came from very small or isolated places. A community having only a single piece of fire apparatus, for example, says, "Cannot take risk of leaving city unprotected." The Fire Chief of another city reports that the nearest town having water-supply is 45 miles away and has plenty of equipment.

It is obvious that with the well-paved roads and the motor-driven apparatus which are becoming increasingly common, many fire departments are now able to render help to neighboring communities over a much wider area than was formerly possible. Of the communities aided some are able to reciprocate in a similar emergency. In such cases no charge is ordinarily made by either city to the other. Warsaw, Ill., reports, for example, that Keokuk, Iowa, Hamilton, Ill., and Warsaw work together in case of a large fire. El Centro, Calif., says: "We have an understanding with Calexico (11 miles), Bramley (15 miles), and Imperial (4 miles) that we will all help each other when called on to do so. We all have pumpers. We also help Holtville or Seeley free of charge if they need us." Elyria and Lorain, Ohio, report a reciprocal arrangement. New Haven, Conn., renders help without charge to any city requesting it which maintains its own fire department. Gardiner, Maine, reports a mutual agreement with Randolph and Farmingdale. The department in Park Ridge, N. J., responds to a code call known to all companies belonging to the New Jersey and New York Volunteer Firemen's Association, covering Bergen and Rockland Counties.

Some of the larger cities have established definite rates at which aid will be

offered to near-by communities. Here are some of these terms, as reported:

HARTFORD, CONN.—To towns not under mutual agreement, \$50 per hour is charged.

EVANSVILLE, IND.—Town calling pays all expenses. No charge for service.

DAVENPORT, IOWA.—\$25 for each piece of apparatus sent out.

SALEM, MASS.—Mutual agreement with Lynn, Peabody, Beverly, Danvers and Marblehead, for which no charge is made. If call comes from towns not having apparatus to return service, a charge of \$50 is made.

DETROIT, MICH.—To corporate villages and townships, \$25 per hour for each company from time of leaving until return to quarters.

GRAND RAPIDS, MICH.—For each piece of apparatus, \$25 to move apparatus, \$25 per hour, and \$5 per mile both ways.

ELMIRA, N. Y.—\$50 per run to adjacent towns; to larger towns, no charge.

JAMESTOWN, N. Y.—\$50 per hour for time from leaving station to return.

CLEVELAND, OHIO.—Flat rate charge of \$350 for each call. Mutual agreement with East Cleveland and Lakewood by which no charge is made.

COLUMBUS, OHIO.—\$250 per call. Contract for next year will be on basis of \$1 per \$1,000 tax valuation of all property on tax duplicate.

Several chiefs, especially of the volunteer fire departments in the smaller communities, report that while no regular charge is made for outside help, donations are accepted from individuals served. Among these replies are:

HOLLISTER, CALIF.—"Free of charge upon call for assistance. If parties making call wish to make a contribution to the department, it is acceptable."

ARCADIA, FLA.—"Parties protected usually pay the boys."

DOWNERS GROVE, ILL.—"No charge. Always get sums donated from \$25 to \$150."

ELGIN, ILL.—"No charge made. Donations sometimes made to pension fund."

MANNING, IOWA.—"No agreement, but expect towns to contribute to apparatus needed from time to time."

DURAND, MICH.—"Insurance company pays firemen and for chemicals used. No charge for equipment."

In some other small cities and towns a regular charge for serving their neighbors is in force, as for example:

ATHENS, GA.—\$20 for apparatus and \$2 per hour for each man sent.

ALEDO, ILL.—\$5 per mile one way and all expenses, including responsibility for any loss or damage from the time of leaving until returning to engine house.

NAPERVILLE, ILL.—\$50 each call, or \$50 each hour or part of an hour.

NEVADA, IOWA.—\$25 truck service charge.

MAYSVILLE, KY.—Flat charge of \$100 for each call.

MILBURY, MASS.—\$100 per call.

ORANGE, MASS.—\$50 to \$100 for use of machine and 50 cents per hour for firemen's time.

PELICAN RAPIDS, MINN.—Minimum charge of \$25 for use of truck and \$1 per hour for men attending fire.

WHITE BEAR LAKE, MINN.—\$25 for use of truck.

BRYAN, OHIO.—Reciprocal arrangement with all motorized towns within \$25-mile radius for assistance without charge. Unmotorized towns unable to reciprocate are charged \$35 per hour or fraction thereof, for use of pumper, hose and six firemen.

LOUISVILLE, OHIO.—\$1 per hour per man for dura-

tion of fire, plus charge for chemicals, gasoline and oil.

OXFORD, OHIO.—No charge to towns. County fires charged \$10 for first two miles plus \$2 for each additional mile. Men receive \$1 for first hour and \$50 cents for each additional hour or fraction.

BERWICK, PA.—Contract with East Berwick, which pays 62 cents per capita per year.

MEADVILLE, PA.—\$50 for first hour; \$25 each for additional hours.

From Delaware comes the report that the state is well equipped with rural fire companies; that these are ordered out first, and that the Wilmington Fire Department will send more apparatus if needed.

In Iowa the State Fire Prevention and Inspection Bureau is promoting cooperation such as in Fort Dodge, where short-length hose couplings are being made up to fit all surrounding towns.

The one touch of humor in the replies comes from Mobile, Ala., whose Chief reports, "Yes, we respond when requested. We have no contract for this work. We take what is offered, and most of the time we get only a 'card of thanks.'"

Standards Immediately Applicable for School-Building Programs

STANDARDS which have received very general recognition among school administrations and which are applicable to metropolitan and suburban regions are incorporated in the "Report of Progress" of the Plan of New York and Its Environs, published February, 1923. These studies of school facilities have been made by two of the experts of Teachers College, Columbia University—George D. Strayer, Professor of Educational Administration, and N. L. Engelhardt, Professor of Education.

In the region surveyed there are 787 separate administrative units for public education. Out of a daily attendance of 1,300,000 children, about 200,000 pupils are on part time. New facilities are therefore needed for 100,000 children at the present time. At \$400 per pupil, a conservative figure, \$40,000,000 is needed for buildings to take care of part-time pupils.

Further, it is estimated that about one-third of the children are housed in buildings that are most inadequate—some insanitary, some dangerous from fire-hazard standpoint, and so forth. To make facilities adequate, an additional expenditure of \$200,000,000 will be required. The total expenditure for buildings, without allowing for growth of population, is thus \$240,000,000.

An estimate of the increase in school population during 1922-30 is placed at 110,000, and for the decade 1930-40 at 100,000. These add \$44,000,000 and \$40,000,000 to the cost of buildings.

In addition, funds for school sites are to be provided.

The more important of the standards for

school-building programs as they touch city planning interests are:

Accessibility

1. Children of the elementary school grade should not be required to travel more than one-half mile to school. The children of junior high school (intermediate school) should not be required to travel more than one mile to school except in the sparsely settled areas where the organization of a school large enough to provide the range of studies desirable may require that they travel farther, or that transportation be provided. In the location of senior high schools, lines of transportation and the securing of sufficiently large site should be taken into consideration, rather than mere accessibility.

It has been found possible in a number of the city areas in which we have worked to provide sites for high schools in the outlying districts. This results in high school children traveling in street cars that would otherwise be little occupied in going to school in the morning, and traveling against, not with, the heavy traffic again at the end of the school day.

Area of Site

2. We propose that an elementary school building, except in the congested areas, have a site of not less than .5 acres; where the unit becomes large, that at least 100 square feet of space per pupil be provided. For congested areas, adequate facilities in gymnasiums and play courts or decks are required.

For junior high schools (intermediate schools) we propose that a site of not less than 8 acres be secured, except in the most congested areas, where special facilities, as suggested above for the elementary school, be provided.

For senior high schools we propose that an area of not less than 12 acres be made available, except in the case of the more congested areas, in which case the facilities for gymnasiums, play courts, and decks will need to

receive special consideration. In all cases in congested areas the location of buildings must take account of the availability of play spaces in parks and playgrounds.

Size of Buildings

3. From the standpoint of economy in the erection of the building, in its maintenance and up-keep, and in the administration and supervision of the school, we propose that, except in sparsely settled areas, no elementary school be constructed of less than 24 classroom units. Wherever possible, this unit should be increased in size. An elementary school unit of 60 classes is not too large.

For junior high schools (intermediate schools) a unit planned to accommodate not less than 1,200 children should be constructed. Considerable advantage in the development of an adequate program, in the cost of maintenance, up-keep, and administration will be effected if this unit can be increased to a building accommodating 1,500 to 1,800 pupils.

For senior high schools a minimum of 1,500 pupils should be provided for in a single unit, with the possibility of increasing the size of the unit to 2,500 to 3,000.

In the somewhat less densely populated part of the area under consideration there would be a real advantage in the development of an elementary school unit to include a kindergarten and the first six grades, and of only one other unit to include the junior and senior high school groups. In this way the six-year high school could be so located as to draw from the area immediately surrounding a total of 600-1,200 pupils as over against the many small (100-600 pupils) and inefficient schools maintained

where the senior high school is organized as a separate unit.

Construction

4. We believe that the buildings to be planned should in the case of all, except temporary or one-story structures, be of fire-proof construction; that they should be so flexibly constructed as to admit of rearrangement of spaces within the building and of additions to the building with a minimum of cost for reconstruction; that the standard unit for elementary and for secondary schools should provide 18 square feet of floor space and 200 feet of cubical contents, per pupil; that window areas should be from 20 to 25 per cent of floor area of the room which they are intended to light; that artificial lighting should be so located as to provide for an even diffusion, as well as a proper number of foot candles on every working space; that adequate sanitary fixtures to include toilets, drinking fountains, wash-basins, should be provided on each floor of each school building; that corridors should be reduced to a width necessary to carry the load imposed upon them; that stairways should be self-contained units with openings into other parts of the building through partitions made of metal and wire glass, thus becoming the very best type of smoke-proof and fire-proof exit; that in larger schools providing special facilities in the industrial arts, shop construction should be utilized rather than the more expensive schoolhouse construction. The planning should, as well, carry further certain investigations which we have already made with regard to the number and size of special rooms to be provided, especially for junior and senior high schools, with a view to utilization of the entire plant during the whole school day.

Wise Public Giving and the Uniform Trust for Public Uses

“WHEN a person contemplates the creation of a trust for some charitable object and is uncertain as to the precise methods of carrying his purpose into effect, or contemplates benefiting a class of persons, an organization or a group of organizations the perpetuity or management of which may be open to question,—in these and similar cases of doubt and uncertainty he may wisely make his donations and bequests to a suitable trust company or bank having trust powers, which is prepared to receive trusts under an agreement known as the Uniform Trust for Public Uses, and thus avail himself of suitable provisions therein made for future adjustments and adaptations safeguarding his original intentions and tending to reduce causes for litigation to a minimum.”

The foregoing paragraph is from a resolution adopted at the Joint Annual Meeting of the Home Missions Council (the national organization of 43 missionary societies in the United States and Canada) and the Council of Women for Home Missions (also a national organization representing

20 constituent boards) held at Atlantic City, January 19, 1923.

In presenting this resolution, the Joint Committee on Trusts in its report made the following observations:

“We recognize the valuable services which the community trust can render to its own community and also see clearly that the Uniform Trust for Public Uses meets equally the same local needs and at the same time makes full provision for non-local benefits of a wider scope, both national and world-wide, in which missionary organizations are interested.”

“One of the great benefits of the Uniform Trust is that it may be in use all over the country, may be known in every part of the land, and lends itself to common understanding and common publicity.”

A complete copy of the Committee's report and of “The Uniform Trust for Public Uses” may be obtained from Daniel S. Remsen of the New York Bar, 60 Wall Street, New York City.

Michigan Practise in Gravel Road Construction

By Levi H. Neilsen

Deputy State Highway Commissioner, Lansing, Mich.

THE specifications for the construction of gravel roads in Michigan in force in 1906, when Michigan began its construction of gravel roads under a uniform specification, provided that 60 per cent of the material should pass a $2\frac{1}{2}$ -inch screen and be retained on a screen having 8 meshes to the linear inch. When patrol maintenance was first organized, it became apparent that the maximum size for the top course was altogether too large, although it had already been reduced from $2\frac{1}{2}$ to $1\frac{1}{2}$ inches. Present specifications provide that top course material must pass a 1-inch laboratory screen and 75 per cent of it must be retained on a screen having 8 meshes to the linear inch; and that base course material must pass a $2\frac{1}{2}$ -inch screen with 60 per cent retained on a screen having 8 meshes to the linear inch. These changes have been found necessary by the experience of the State Highway Department in patrol maintenance of gravel-surfaced roads.

Road work in the various counties in Michigan is handled by a Board of County Road Commissioners consisting of three members with staggered six-year terms. These men comprise an administrative board and are appointed by the Board of Supervisors or elected by popular vote, according to the option of the Board of Supervisors of each county. This board engages an engineer to direct the maintenance and construction work, or a qualified superintendent to direct the field operations.

Surface Maintenance

On gravel road work a variety of equipment for keeping the surface smooth will be found, depending on the location and the amount of traffic using the road. It has been found necessary in some cases to drag or scrape the surface once a day regardless of weather conditions. To do this, light, one-man graders drawn by a single team of horses are very frequently employed.



APPLYING BITUMINOUS MATERIAL TO A GRAVEL ROAD IN MICHIGAN

Trucks on which a scraper has been fixed under the frame between the front and rear axles have shown considerable success in this work. Some counties use hones drawn by tractors, others use light graders drawn by tractors. Dragging or scraping is done as often as necessary to keep the road in good condition. On heavy-traffic roads, it has been found necessary to keep a small amount of loose gravel on the surface so that there will be some material to move around to fill the holes and ruts and keep chatter-bumps out.

The charges below include such work on the grade as snow removal, markers and signs, equipment rental, overhead, supervision, etc., so that the costs given represent a great deal more than the surface maintenance of the pavement itself. Average costs based on a mileage of a little over 6,000 miles in 1922 for the mainte-

nance of various types of roads per mile, are as follows:

Earth roads	\$179.05
Stamp sand roads.....	277.10
Gravel	444.63
Macadam	537.39
Bituminous macadam roads	550.63
Bituminous concrete roads	342.73
Cement concrete pavement.....	553.21
Unclassified	341.56

Experiments in Surface Treatment of Gravel Roads

Extensive experiments in the use of a variety of materials for the surface treatment of gravel roads and the use of light oils and calcium chloride for dust-laying have been conducted in conjunction with the Highway Department of the College of Engineering of the University of Michigan. The tentative conclusions reached by G. C. Dillman, Maintenance Engineer of the Highway Department, and Herschel C. Smith, Assistant Professor of Highway Engineering, University of Michigan, are as follows:

Any surface treatment of gravel roads for dust prevention should extend the full width of the traveled way rather than over a portion of the center of the road.

For general use as a dust palliative on Michigan gravel roads, calcium chloride is the most satisfactory from the point of view of general applicability—application by unskilled labor and adaptability to various types and conditions of road. It is impossible, with these service tests of one season, to reach conclusions as to its effectiveness and economy compared with other dust palliatives investigated.

No distinction can be made between granular and flake calcium chloride as to effectiveness.

Calcium chloride supplied in the 100-pound bag container is more economically handled than that supplied in the 350-pound metal drum, and it appears that it might be profitable for the necessary storage to be provided so that this economy could be realized.

The use of calcium chloride slightly increases the cost of blade maintenance.

It appears that a light oil having the following properties can be used on a gravel road even under a traffic of 1,500 vehicles per day, in case there is a sufficient amount of loose material on the surface to absorb at least 75 per cent of the oil:

Specific gravity 25° C./25° C.....	0.910
Specific viscosity 25° C.-50 cc.....	10.7
Flash point open cup.....	95° C
Bitumen soluble in carbon disulphide.....	99.83
Loss at 163° C. 5 hrs. 20 C.....	15.31
Penetration of residue, 25° C.....	Residue

Where the light oil is applied in a greater quantity than that which the loose material will absorb, it forms a thin glazed surface in the compacted portion of the road, and the loose material which is quickly swept from the road cannot be successfully replaced, as there is no tendency for material returned to the surface to adhere and become incorporated in the surface.

It is impossible, as yet, to standardize the use of light oil as a dust palliative for Michigan gravel roads, because of the necessarily exact relation that should exist between the amount of oil applied and the amount of loose material. In no case should more than $\frac{1}{8}$ -gallon per square yard be applied, and the amount should vary with the amount of loose material on the surface.

The heavier bituminous materials used cannot be applied for a dust preventive on Michigan gravel roads except as a material for forming a bituminous surface.

Bituminous Surfaces

Regardless of the material used, a successful bituminous surface cannot be formed on a gravel road unless there is first a firm, even, hard surface on the gravel road which is free from loose material.

Bituminous surfaces formed within the limits of the preceding paragraph and with the materials and amounts used in these tests, do not disappear uniformly.

It appears that bituminous treatments made without top dressing and expected to disappear annually, although apparently satisfactory during the summer months when used on a high type gravel surface, will leave the road in such shape that succeeding treatments will be impracticable unless the roadway surface is reconstructed, and, furthermore, will impair the quality of the surface if it is to be maintained thereafter as an untreated gravel road.

It appears that it would be possible, however, to develop a bituminous surface, using a suitable metal top dressing, on firm, even, hard, well-cemented gravel roads, of which there are relatively few miles in Michigan.

ACKNOWLEDGMENT.—From a paper read before the Annual Convention of the American Road Builders' Association, at Chicago, January, 1923.

Chamber of Commerce Activities in Public Affairs

"Go Through and Graduate"

ATTLEBORO, MASS.—Last spring there was a great deal of dissatisfaction among the School Committee and the teaching force of Attleboro on account of the attitude of the City Council in cutting down the appropriations for the school system. The main dissatisfaction grew out of a feeling that no advancement in salary was to be given for the next school year. This actually happened, and as a result a large number of our teachers resigned and went elsewhere. The matter came up before the Board of Directors of the Chamber of Commerce, and we planned a definite campaign last fall to create the right feeling among the school teachers, the City Council, and the community at large. The plan developed as follows:

1. To give a reception to the school teachers, the City Council and the School Board in the Chamber of Commerce Hall to welcome the new and the old instructors and to create a better feeling among all present.

2. To help parents to understand the value of an education for their children, and

3. To stimulate the children's interest to continue their studies and to graduate.

The first feature of the plan was carried out very successfully and was reported as one of the most important civic gatherings ever held in Attleboro. The result has been an undeniably better understanding of the educational problems of the city on the part of the business men, and stronger confidence on the part of the teachers and the school officials in the readiness of the business public to cooperate with them. A secondary result has been the creation of a fine spirit of hospitality, especially appreciated by the new teachers, who constitute nearly one-fourth of the total number.

In working toward the second object of

the plan, the following letter was mailed to parents, signed with facsimile signatures of the members of the Educational Committee:

AN OPEN LETTER TO PARENTS

To bring children into the world, and be responsible for their development, is a great privilege, as well as a responsibility. To clothe and feed them, to watch them grow, to educate them, and then to see them take their places as respected citizens is really a wonderful source of satisfaction to parents.

While the Attleboro Chamber of Commerce is a commercial organization, it is vitally interested in all civic and welfare work that helps to make the city a better place in which to live and do business.

In nothing, however, has it a deeper interest than in Attleboro's schools and the education of her boys and girls. In this Chamber you will find many men whose greatest regret is that their early education was incomplete, and who now realize what a great

IT PAYS TO GRADUATE

IF you ever hear of a boy or girl who wants to quit school, when it is unnecessary; if you ever hear of parents who are thinking of putting their children to work, when it is unnecessary, just bring these figures to their attention.

Every day spent in school pays the child \$9.

Here is the proof, based on the wage scale of 1913:

Uneducated laborers earn on the average of \$500 per year for forty years, a total of \$20,000.

High school graduates earn on the average \$1,000 per year for forty years, a total of \$40,000.

This education required twelve years of school of 180 days each, a total of 2,160 days in school.

If 2,160 days at school add \$20,000 to the income for life, then each day at school adds \$9.25.

The child that stays out of school to earn less than \$9.00 a day is losing money—not making money.

These figures are based on an investigation made by Dr. A. Caswell Ellis of the University of Texas, at the request of the U. S. Bureau of Education.

LEAFLET USED IN ATTLEBORO CAMPAIGN

Copyright, 1922, Harter School Supply Co.

handicap it has been to them. Perhaps you who read this have been so handicapped and thereby kept from realizing some great ambition.

Attleboro's best asset is her schools, and we are sure that it is a tragedy when a child is obliged to leave the public school before graduation. We want them and you want them to get all the education possible before they accept the responsibilities of tomorrow.

The Chamber of Commerce, in the spirit of community helpfulness, is planning to mail from time to time to the students of the upper grades interesting circulars along the order of the ones enclosed, which will tell briefly and show by suitable pictures the value of an education. These, it is hoped, will encourage the boy or girl to continue in school and take advantage of an education offered free right here at home. We know that you will welcome this help and will give us your hearty cooperation.

When your son or daughter receives letters from us later on, encourage him or her to read them, and thus by cooperating, worth-while results will be forthcoming.

With all good wishes, we remain

Most sincerely,

EDUCATIONAL COMMITTEE OF THE ATTLEBORO
CHAMBER OF COMMERCE.

Two leaflets were enclosed showing the value of a high school education.

It is intended to send letters to the students every six weeks up to the beginning of school next fall in order to create a much greater interest in school work. The ten leaflets which we are using were secured from the Harter School Supply Company, of Cleveland, Ohio, and they put across a lesson that is well worth while. The students to whom we are making our appeal are in the grades from the sixth to the first year of high school. In the words of one of the leaflets:

"You must learn if you wish to earn."

G. CORNELIUS BAKER,
Secretary, Attleboro Chamber of Commerce.

Memorial Bridge from Portsmouth, N. H., to Kittery, Maine

PORTSMOUTH, N. H.—The new Memorial Bridge connecting this city with Kittery,

Maine, which will shortly be ready to turn over to the proper authorities for an official opening, is expected to become a factor of great importance in improving transportation between northern New England and Canada and the rest of the country.

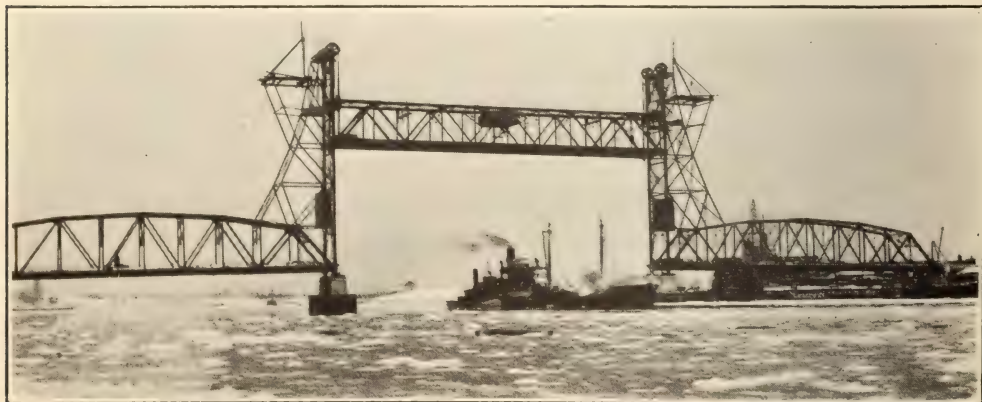
The structure proper, which is being built by the American Bridge Company, will cost \$1,500,000 to build. The United States Government contributed \$500,000, and the states of New Hampshire and Maine equal amounts. In addition, the city of Portsmouth is expending over \$150,000 for approaches, connecting directly with the two main streets of north-and-south traffic through the heart of the city. The state of Maine is expending over \$200,000 for approaches at Kittery. The total cost of this massive improvement will easily total \$2,000,000.

The Portsmouth approach starts right in the heart of the city, then the bridge crosses the deep waters of the Piscataqua River, with a big draw-span, and then the bridge continues to Badgers Island and on to the mainland.

The draw-span weighs 750 tons, is 300 feet long, and is considered one of the highest lift-spans in the country. Electric-driven weights raise the span 185 feet in the air, allowing the biggest ships to pass up the river.

The Piscataqua River never freezes, because of its deep and fast current, making river traffic continuous the year around. The Portsmouth Navy Yard is located at the Kittery side of the new Memorial Bridge.

The bridge will divert several thousand



NEW MEMORIAL BRIDGE BETWEEN PORTSMOUTH, N. H., AND KITTERY, MAINE

automobiles during the summer months from the toll-bridge of the Boston and Maine Railroad, for years the connecting link between the two states. The Memorial Bridge will have no toll charges, and will shorten the route and save considerable time.

The planning of the bridge so as to have such a high lift is indicative of the efforts of the Portsmouth Chamber of Commerce towards making this city a real live port. The New Hampshire Legislature is planning for a State Pier that will be located above the bridge.

ROBERT J. EUSTACE,
Managing Secretary, Portsmouth Chamber of
Commerce.

A Zoning Ordinance for Oneonta

ONEONTA, N. Y.—With the appointment of a City Planning Commission and the engagement of a consulting engineer to assist in drafting a zoning ordinance, the Oneonta Chamber of Commerce has reached a desired goal.

Public sentiment was lined up in favor of the measure after the holding of four forum meetings at which consulting engineers and others spoke, and after securing a mail referendum of the Chamber membership. The zoning film, "Growing Pains," shown at a joint dinner of the Chamber Directors and the city officials, presented strong arguments for the efficacy of zoning. The erection of buildings which injured property values and which could have been properly placed through zoning regulations also helped the cause.

EVERETT HICKS,
Secretary, Oneonta Chamber of Commerce.

Everybody Is Working for Jackson's New Park

JACKSON, TENN.—This city has set aside a 5-acre wooded tract to be used as a combined park, children's playground and tourist camp. The Association of Commerce is fostering a movement by which the various civic, fraternal and labor organizations will provide the equipment and facilities for the park. The city is doing the grading, road-making and sodding. A local landscape architect has given his time to the pruning of trees and to the planting and beautifying of the grounds. The Rotary Club is furnishing the playground equipment, the W. C. T. U. the drinking fountains. Members of the Association are furnishing building

materials, and a small fund to pay for labor is to be raised by the combined organizations. The automobile dealers are furnishing all of the equipment and buildings for the tourist camp.

The park is to have a baseball diamond, a band-stand and shelter house, special seating space for band concerts, and tourist facilities, including an enclosed kitchen with gas and water, and comfort buildings. The school children of the city paid for a memorial stone and tablet and took part in services on May 1 dedicating the park as a Centennial Memorial.

EDWARD D. WILDER,
Executive Secretary, The Jackson Association of
Commerce.

Port Development in Olympia

OLYMPIA, WASH.—The major activity of the Olympia Chamber of Commerce for 1922 was the creation of a port district, with a view to constructive industrial development. This issue was carried in the November election. Since that time the efforts of the Chamber have been to assist the newly elected Port Commission in every way possible, and for our own particular share to begin the educational campaign which a little later will resolve into an intensive campaign to see that the development plan for the port and the financing of it through bonds are carried at the election proposed for this spring.

One of the fine accomplishments of the past year, brought about through this organization, was the establishment of a new boulevard lighting system for the business district. The system is now being installed.

B. F. HUME,
Secretary, Olympia Chamber of Commerce.

Relief for Traffic Congestion

MUNCIE, IND.—The three railroads passing through Muncie cross the principal streets within a few blocks of the center of the city. Traffic has been stopped by heavy freight trains for as long as 45 minutes at a time. For many years the Chamber of Commerce endeavored to correct this condition, and in turn the city officials made the same effort, but nothing was accomplished.

To-day the city officials and the Chamber of Commerce are working together on this project, and the railroads are giving us a cut-off around the city where through

freight can be routed instead of passing across the city streets. This leaves only passenger trains to interfere with traffic in the city, and with four subways we shall have what Muncie asked for for many years but never received because never before have the city officials and the Chamber of Commerce met together and gone over the various problems.

We feel that our biggest gain has been, not the elimination of railroad evils, but the securing of cooperation between the city officials and the Chamber.

S. N. VAUGHN,
Secretary, Chamber of Commerce and Commercial Club.

Five Forward Steps in Detroit

DETROIT, MICH.—On April 2, four city proposals and an amendment to the state constitution were approved by the voters in Detroit:

1. Pensioning city employees after 25 years' service
2. Accepting gift of zoo site from Detroit Zoological Society, costing \$1,250,000 over 5 years
3. Approving \$5,000,000 bond issue for extension of Department of Street Railway system
4. Approving \$12,000,000 issue of bonds for municipal power-plant
5. Adding a new section to the state constitution authorizing the Legislature to provide for the incorporation of ports and port districts, with power to engage in work of internal improvements

The constitutional amendment had the strong backing of the Detroit Board of Commerce. On a total vote of 474,549 cast, there were 266,623 votes for the amendment, and 207,926 against it—a majority of 58,697 in favor of it. Through its Port Development Committee, the Detroit Board of Commerce has already begun to plan for the necessary enabling act, which the State Legislature will be asked to pass at its next session. The committee is working with the State Attorney General's office in an attempt to work out a uniform enabling act which may be used by all the port cities. Such an act would make possible the creation of the Port of Detroit, and would permit the Port Commissioners to plan out a definite program of improvement.

C. E. BOYD,
Assistant Secretary, Detroit Board of Commerce.

Work for the Public Schools

WINCHESTER, KY.—One of the items in the Winchester Chamber of Commerce has been "Improvement of School Facilities." Efforts have been steadily directed toward having the School Board call an election for the voting of funds for this purpose. In this the Chamber was successful. Two new members elected to the School Board last fall and a third member reelected have all pledged themselves to improve local school conditions. Acting on the request of the Board of Education, the Chamber appointed an advisory school committee to study the matter of the selection of sites and the facilities which the buildings should contain, and to confer with the Board on these points.

On January 29 the citizens voted a bond issue of \$150,000, the maximum allowed by law. The Chamber of Commerce took full charge of the campaign, at the request of the Board of Education, and carried the election by a majority of a little better than three to one.

This is the second big accomplishment by the Chamber in two months. In January we promoted the road tax levy of 20 cents on each \$100 assessed valuation for a period of two years. This issue was carried in the county election by a majority of four to one.

ELLIOT G. KINGSBURY,
Executive Secretary, Winchester Chamber of Commerce.

Proportional Representation Endorsed by Sacramento Chamber of Commerce

On January 24 the following resolution was adopted unanimously by the Board of Directors of the Chamber of Commerce of Sacramento, Calif.:

"Whereas, the courts have decided that the state constitution (unless amended) will not permit the election of a municipal legislative body by the system known as proportional representation,

"And whereas, the experience of the city of Sacramento in the election of a representative council by this method has been highly satisfactory,

"And whereas, we believe the intent of the state constitution is to accord the fullest measure of home rule to incorporated cities;

"Be it hereby resolved, that it is the sense of the Sacramento Chamber of Commerce that a constitutional amendment should be passed permitting chartered cities to elect their legislative bodies by proportional representation, if they so desire."

Opening of the New Orleans Inner Harbor Navigation Canal

By Walter Parker

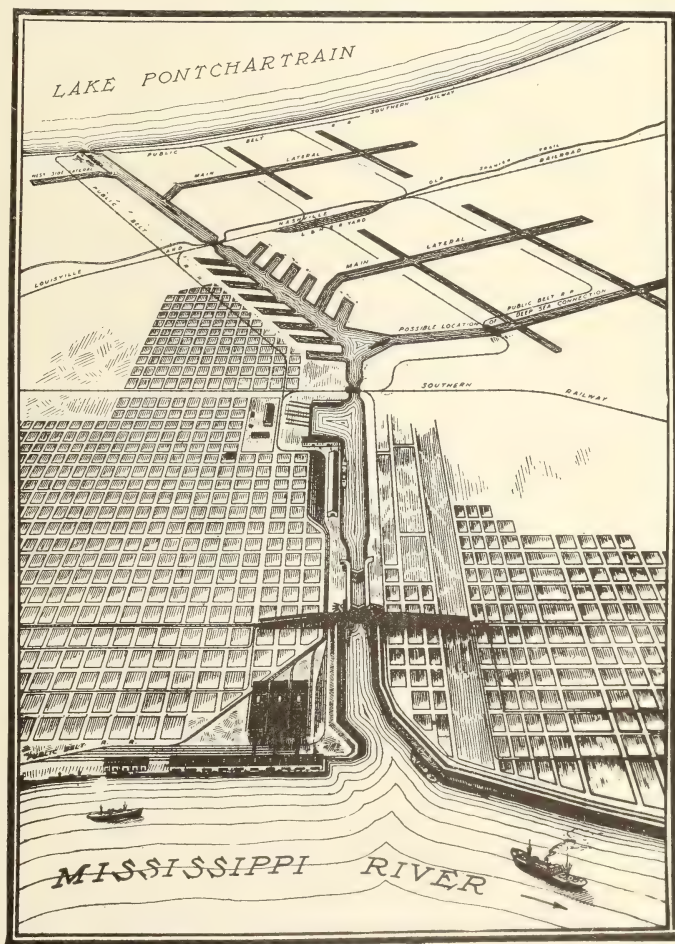
General Manager, New Orleans Association of Commerce

MAY 5, 1923, witnesses the formal opening of a \$20,000,000 facility which will mean much for the commerce of New Orleans and of the entire Mississippi Valley. It is the Inner Harbor Navigation Canal, paid for by the people of New Orleans without Federal aid, and the first step in the construction of a new ship canal from New Orleans to the sea.

Changing world trade routes made Carthage, developed Venice, forced the Panama Canal, and now gives New Orleans a world port opportunity of a new order—an opportunity to serve the Mississippi Valley efficiently and at low cost. To capitalize that opportunity, New Orleans, with public money, has built wharves, warehouses, elevators and terminals, and has now completed this great inner ship harbor and industrial canal. This makes possible complete coordination between transportation, factory and warehouse, and clears the way for continuing uninterrupted development under a well-considered policy by which both public and private enterprise may find free play under the most wholesome conditions.

Public ownership of harbor sites, as practised at New Orleans, is not confined to the mere building and operation

of port facilities. The idea is to supply, with public funds, facilities for shippers and transportation lines which are not ready to create facilities for themselves, leased sites for those who desire temporary occupancy, and an opportunity for fee simple ownership of harbor sites for those who desire to invest in industrial facilities for permanent occupancy.



PLAN OF THE INNER HARBOR NAVIGATION CANAL
AT NEW ORLEANS

The working out of this broad policy has required many years of effort. Prior to 1896, the public owned all the river harbor frontage but had not created any machinery for the practical operation of the port under public ownership.

A Board of Commissioners of the Port of New Orleans was created by law in 1896. It sold some bonds, against the revenues of the port, and built some covered wharves, then some warehouses and other facilities. Ultimately this Board was taken out of politics and given enormous powers in the constitution of Louisiana. Its vision developed as its work progressed.

To-day the Board is composed of five of the strongest business men, appointed by the Governor for definite terms. It serves without pay, and acts as a Board of Directors. It names a general manager, who need not, at the time of his appointment, be a resident of the state, and empowers him to operate the port in the same way any other large enterprise is operated.

Inner Harbor and Industrial Canal

New Orleans covers an area of 196 square miles—all of Orleans Parish, or County. Much of this area has not been needed by the city, and had remained undrained and unused. This area, part of which has recently been drained, lies between the Mississippi River and Lake Pontchartrain, an arm of the Gulf of Mexico, and large portions of it are within three miles of the center of New Orleans' banking and business district. Lake Pontchartrain is five miles from the river. Because of the rise and fall of the river, a ship lock was necessary in order to adjust the levels in the Canal and Inner Harbor, between the Gulf and the Mississippi.

The area of low-value land adjacent to the Canal and Inner Harbor, which is available for development into privately owned harbor frontage through the dredging of lateral ship channels and canals, is 96,000 acres in extent. The land is low and level. There are no rocks in it. Spoil from the dredging of laterals and harbors raises the remaining land, giving it natural drainage.

The value of this land as harbor frontage so greatly exceeds the present value, plus the cost of changing it into harbor sites, that there should be ultimately enough profit out of the increment alone to pay off

the \$20,000,000 cost of the lock and primary Canal and Inner Harbor. At least, that is the basis upon which port economists are now working.

New Ship Channel to the Sea

Silt and current create a channel problem at the mouth of the river, 110 miles below New Orleans. South Pass, where the Eads Jetties is, has served as a 31-foot channel since 1879. Some years ago the Government began work on a 35-foot channel through Southwest Pass, but has not yet succeeded in getting the desired depth there.

The completion of the Inner Harbor and Industrial Canal Lock now makes possible the dredging of a ship channel of 40 or 45 feet depth direct to the Gulf through Lake Pontchartrain, which will be free from silt and currents. Such a channel would strike the Gulf many miles east of the mouth of the Mississippi. Ninety per cent of the ships coming to New Orleans approach from the east. Through such a channel, nine out of every ten ships would save possibly 24 hours' time on every voyage to and from New Orleans. The money value of such saving, it has been estimated, would equal the cost of such a channel in a period of less than three years.

By opening such a channel the Federal Government would greatly facilitate the commerce of the Mississippi Valley, and ultimately save much monetary outlay. Sailing ships could then reach the main harbor of New Orleans under their own sails. The Inner Harbor Lock into the river harbor would also serve the new channel to the sea, which would reduce the cost of such a channel by half. Such a channel is a probability of the near future.

Port Economy

As a rule, bulk commodities are produced and made ready for market at one season of the year, and must rest in store somewhere until gradually consumed by the world. The producer needs money, and so must call upon the middleman to carry the load until consuming markets become available. It follows that the greater the cost, risk and difficulty ahead of the middleman, the greater the margin of profit and expense required by him. This means lower returns to the producer and higher prices to the consumer.

It also follows that where world-used commodities are rapidly passed into consuming markets, before required for actual consumption, they often lose relative value because they cannot again be offered for sale in world markets, as would be the case were they held in store in primary supply markets until actually required in some market. This is well illustrated by the case of cotton. Once cotton crosses the ocean to Liverpool it must carry the cost of ocean transportation, and it cannot be resold to American or Oriental mills. But so long as such cotton remains in a primary supply market such as New Orleans, it maintains its parity and may be resold into any consuming market. In most years cotton values in winter, spring and summer reflect a greater increase over fall values than the mere carrying charges amount to.

Lost motion in handling, unnecessary drayage, high costs of labor, insurance and

money, and delays which impose a burden on transportation are a factor of moment in every American port, and reduce the advantage American traders should naturally enjoy by reason of an abundance of raw material, unimpaired credit, and potentially low cost of transportation. Port congestion, resulting from lack of proper planning, from personal greed, and from an absence of unselfish guidance and authority, has resulted in high charges in many American ports, which in turn narrow world competitive markets for American products.

Knowing these facts, and given a wide-open opportunity for the testing out of schools of thought, and competitive policies, and for encouraging enterprise and business endeavor, the New Orleans port authorities have planned for to-day and to-morrow, and are in position to provide policies under which any wholesome tendency in commerce and industry may be fostered.

The Cost of Furnishing Water for City Uses

THE following tabulation shows the consumption of water by municipal departments in Springfield, Mass., during 1922. The accrued earnings to the water-works department are properly credited on the books. This amount, however, is annually charged off as uncollectible, in accordance with the provisions of the city ordinance.

MUNICIPAL USE OF WATER, 1922 IN SPRINGFIELD, MASS.

Classification	Amounts	Gallons	Remarks
Schools	\$8,335.80	125,037,000	92 per cent metered
Public buildings (other than schools).....	2,931.85	43,977,750	90.2 " " "
Public parks.....	2,808.15	42,122,250	67.8 " " "
Public playgrounds.....	452.95	6,794,250	4.8 " " "
Building purposes (streets and engineering department)	286.80	4,302,000	Unmetered
Sewer department.....	2,578.60	38,679,000	"
Snow removal (via sewers).....	1,301.33	19,520,000	Metered
Street washing and sprinkling.....	1,481.86	22,228,000	Unmetered
Total of above.....	\$20,177.34	302,660,250	
Fire hydrant service.....	50,850.00	(not reducible to quantities, at \$25 per hydrant)	
Total municipal use.....	\$71,027.34	(as per Registrar's report)	

Training Sewage Works Managers in England

THE Windermere Urban District Council, England, recently decided to send its candidate for manager of the Council's sewage disposal works to be trained in the treatment of sewage for a period of two months at least to Newcastle-under-Lyme. The Council is to pay his traveling expenses, a weekly wage of £2 7s. 6d. and £1 5s. per week to cover his board and lodging while in training;

and if he is ultimately appointed manager, £2 10s. per week and £1 5s. per week board and lodging until the Council can provide him a house at the sewage disposal works at Tower Wood. The manager of the Newcastle works is to be given the sum of 10 guineas for his services in instructing the prospective manager of the Windermere sewage disposal works in the conduct of the plant.

The Police and Public Opinion

By Bruce Smith

National Institute of Public Administration and New York Bureau of Municipal Research

THE "crime wave" which figured so prominently in the news heads of six months ago, and which for a time engaged the attention of the entire country, has now largely disappeared from the front sheets and no longer furnishes a topic for contentious discussion and debate. Public interest centered upon police activities for a few weeks, and then became focused elsewhere. Taken by and large, police departments seem to be relieved to find that the period of inquisition has at last passed, and that they may now look forward to no more serious criticism than is provided by the comic supplements and the motion pictures.

Criticism of the Police

While it may be that the mass of citizens are somewhat predisposed to criticize and condemn the police, this critical attitude is more easily aroused than maintained. This is unfortunate, because it is far more desirable that the police should be attacked—no matter how unfairly—than that they should be forgotten altogether. It must have been some such thought that actuated Superintendent Fitzmorris to plead for citizen interest in the Chicago Police Department, even though it were "a critical and a suspicious interest."

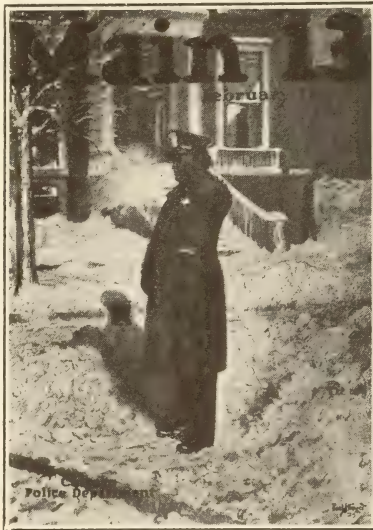
Let us examine the effects of popular apathy and popular criticism in order to determine which of these, *from the standpoint of the police administrator*, is most to be desired. To do so, it is only necessary to go back, say, to 1917, when the march of world events became so engrossing as to crowd every other question out of the pub-

lic consciousness. In common with other every-day domestic matters, the police departments of the country lost what little hold upon public interest and attention they had previously enjoyed. They lost public attention in spite of the fact that the war emergency had created novel and difficult problems for them to contend with. With the return to a peace-time basis the so-called "crime wave" put in its appearance and carried all before it. Public interest in the police departments revived, and with a vengeance. The law-enforcing agencies of the country found themselves unprepared to meet the situation with which they were suddenly confronted.

The Changing Crime Problem

Briefly stated, that situation was as follows: Beginning in 1913, the automobile industry had made astonishing progress, annual production increasing over 200 per cent by 1916, and reaching a peak in 1920. The results are generally known and understood, and, indeed, constitute the merest commonplaces. With the almost universal use of the

automobile, the street traffic problem became so acute as severely to tax the ingenuity and resources of police departments in both large and relatively small communities. Demands for traffic officers became increasingly heavy. In most instances these demands could be satisfied only by transfers from patrol duty. Thus it came about that the patrol force was reduced to a point where it was inadequate for the effective protection of life and property, even under the old and familiar conditions.



A WINTER COVER OF "MAIN 13,"
THE ORGAN OF THE CHICAGO POLICE
DEPARTMENT

On account of the new telephone number of the Department the February issue announces a probable change of title to "Police 1313"

But the crime problem itself had also changed, and changed in such a manner as to render obsolete tried and tested police methods, some of which had withstood the changing needs of generations. And here again, it was the automobile which crashed into and mowed down established police practises, and again we find the year 1913 marking a definite turning-point in the history of police development. It was in this year that the gambler, Herman Rosenthal, was shot and killed by hired assassins as he left a hotel in the heart of the Manhattan theater district during one of that section's busiest hours. The case secured nation-wide attention at the time and will be remembered now chiefly because it introduced to the general public the now familiar gunman and also because of the prominent part played by the gray murder car in which the murderers escaped from the scene of the crime.

It came as a distinct shock to many that the automobile, previously considered as being merely a pleasure vehicle, should be employed also as the "get-away" of criminals. Yet that outstanding example has been so widely and effectively imitated—and even improved upon—in a few short years, as to render foot patrol in cases requiring immediate action as obsolete as the watchman's rattle generally used by the night-watch policeman of two hundred and fifty years ago.

Here and there were police administrators quick to appreciate the handicap under which they now found themselves operating. In a few instances they were able to secure at least a part of the motor equipment which had become so necessary, but in too many instances their requests were greeted with a chorus of disapproval from press and public, together with caustic allusions to "joy-riding cops." Even within the last two years, the efforts of the

Police Commissioner of New York to stem the rising tide of crime which threatened to engulf the city, by consolidating precinct stations and providing motor patrol for certain sections, were strenuously opposed by the very newspapers which had been most insistent upon vigorous police action. But in spite of the obvious unfairness of their attitude, it is to be noted that the insistent criticism of a certain section of the metropolitan press gave extensive publicity to the police program, and probably aided in securing the support of the policy-forming branches of the city administration for new police equipment.

As a means of meeting the need for more extensive public interest in police methods, it has been suggested from one source that an official press agent be retained for police

departments, who would hold daily interviews with the newspaper men covering police headquarters. The natural distrust with which such a scheme would generally be viewed provides the chief argument against its use.

It has been the present writer's observation that citizens' committees and crime commissions have been very effective in at least three cities in supporting the extension and improvement program of the police department. It must be conceded, however, that in most cases the civic bodies' method of approaching police

headquarters is not such as to inspire trust and confidence in police circles. Police administrators, on the other hand, are quite generally subject to the charge that they have not met citizens' committees half-way.

There is also some evidence to support the belief that police department publications, such as *Main 13* of Chicago, and *The Police Journal* of St. Louis, have served to quicken citizen interest and improve the popular understanding of police problems.

Police Journal

Vol. XI WEDNESDAY, FEBRUARY 14, 1923. No. 48

POLICE RELIEF ASSN. WILL GIVE ANNUAL CIRCUS AT COLISEUM.

The fourth annual Police Circus will be given at the Coliseum, April 2 to April 15, inclusive, fourteen days, twice daily, 2.15 and 8.15 p. m., on a higher scale than any other indoor circus ever before presented.

The event is the annual appeal for funds by the St. Louis Police Relief Association, and is a very worthy one apart from the fact that a program of exceptional value in circus novelties is offered for the entertainment of the young and old.

The success of the Police Circus has never been excelled in the history of indoor events, and, while it has been copied all over the country, no similar event has ever equalled the attendance and popularity.

The show will be presented in three rings and hippodrome track, an arrangement having been made with the Coliseum management to take up the wooden floors for the engagement. Although the expense will be great, the Association feels justified by the opportunity of presenting the circus performances on the grounds, many novelties, such as horse acts, etc., being unable to perform on the floor.

Among the forte features of this year's show will be the famous Madame Bedouin and her Liberty horses, including Morgan, the only horse dancing "Yankee Doodle" the entire length of the hippodrome track. The five Riding Lloyds, direct from South America, the world's premier equestrians, Patterman's Challenge Performing Elephants Lady Walton, in principal riding act, the Fainting Slayers and company.

act, the Fantino Sisters and company Queens of the Aerial Rings, eight Morales Family of Mexican wire walkers, trapeze performers and death defying slides for life. Freds Four performing seals Helen Clark Trio, trapeze and Roman ladder. Five Living Fishes worlds greatest acrobats.

five flying flabbers, world's greatest aerialists. Eight Mangan Troupe of wonders working acrobats Gordon Brothers and their boxing kangaroo, Patterson's ponies goats and high school horses Mellor and his famous skating bear Hamilton's human butterflies, Charles Mannello and company.

butterflies. Charles Manello and company, a renowned marvel in extraordinary balancing. Upside-Down Bell Ringers, an original band and head-balancing feature. Dainty Ethel Marine, trapeze and web. Pedrosa Cuban wire marvel. Lupita Cortez, Mexican wire king. Esther Telf, ventral balancing.

wire king, Fisher Trio, counter horizontal bar gymnasts, the Riding Waltons, two horse carrying act, Slayman Ali's Eight Blue Devils, genuine and best Arab troupe in

(Continued on page 11)

(Continued on page 13)

SPLENDID ADDRESS MADE TO BOYS
BY SERGEANT E. J. MARTINEAU

Col Philip H Brockman, president of the Board of Police Commissioners, is in receipt of the following letter from Sergeant Eugene J Martinou of the Ninth District, dated February 4

"I received your letter of February 4 and was deeply pleased at your prompt and encouraging reply. It should be the aim of all policemen at all times to take advantage of every opportunity to demonstrate to the boys that the policeman is his friend, in order that he may grow up with respect for all things pertaining to law and order. Enclosed please find copy of my address to the boys of the Junior Safety Cadets Committee of the St. Louis Safety Council which I delivered at their meeting at the Fox Liberty Theatre on February 3, and which I trust you will enjoy reading."

The address made by Sergeant Martineau is such a good exposition of what the attitude of officers should be towards boys and girls that the Journal is pleased to publish it in full for the information of its readers and at the same time thanks the Sergeant for having given his time and energy in favoring it with a copy of the speech. He did talk he made to the youngsters on matters of most vital importance to them.

Address of Sergt. Martineau.

Bovis, the St. Paul councilman, gave me a good deal of pleasure to come here this morning and to be given the opportunity to speak to you. I am glad to be here with you.

First a movement that has for its purpose the preservation of life and limb and the spreading of the light upon the question naturally arises. What relation does the policeman have with this movement?

First? The answer is that the policeman is one of the important factors in it with the difference that because his duties bring him into direct contact with all kinds of accidents and with all kinds of accidents, every accident that you hear of read about. Some policeman has made a report about it and he has furnished the details in connection with the accident, taking care of the injured, and sometimes the dead, and sending a thorough investigation as to the causes. In order to determine what might be taken, if any.

The policeman also reports and

Finally, there may be mentioned the plan recently devised by Commissioner Enright of New York. In an effort to establish a closer relationship between his department and the people of the city, the Commissioner has organized "a tribunal to be known as the 'Police Efficiency Forum,' to be held (monthly) at police headquarters, where any citizen may appear" and be heard orally respecting suggestions or recommendations tending to increase the efficiency of the Police Department. Complaints against members of the department will not be taken up in the Forum, but will follow the usual course. Not only does this scheme provide a new point of contact for police officials and the public, but it gives the Police Department an opportunity to present its needs and its problems to a group of interested citizens, and, above all, it makes "news" of the *reasons* underlying the police program.

The order establishing the Forum has only recently been promulgated, and it is therefore too early to judge of its effect. It is probable, however, that circumstances peculiar to a great center like New York will deprive it of some of the success which might readily be secured in a smaller city. As a most recent device for enabling the police and the public to see "eye-to-eye," it deserves the continuing attention and interest of police administrators throughout the country.

There are so many police problems which clamor for early recognition and solution that one naturally hesitates to evaluate them and to present one or two as being of great urgency and of more importance than all the others. But it may be confidently stated that until the exceedingly delicate relation of police to public has been adjusted, the development of police forces to meet changing conditions will be retarded.

A Demonstration in Methods of Preventing Delinquency

A FIVE-YEAR Program to demonstrate methods of undermining causes of delinquency was recently inaugurated by the Commonwealth Fund. It is becoming increasingly apparent that delinquency in later years is often due to maladjustment in child life. The Program is therefore seeking to demonstrate what can be done through psychiatric clinics serving children referred from juvenile courts and other agencies, and through visiting teachers placed in public schools, to diagnose and treat children who present behavior problems. The Program consists of four sections.

One section provides for traveling psychiatric clinics maintained by an appropriation made to the National Committee for Mental Hygiene. Upon invitation and under suitable conditions, one of these clinics may be located in a community for a period of from six to twelve months, after which a permanent clinic is to be established under local auspices. The first demonstration was begun in April, 1922, in St. Louis. As a result, an ordinance was recently passed establishing a permanent clinic under the Department of Public Welfare. Meanwhile, the traveling clinic has moved on to Norfolk, Va., for a similar demonstration there. A second traveling clinic has now been organized and is at work in Dallas, Texas.

Each clinic has a staff consisting of a psychiatrist (a physician specializing in mental hygiene), a psychologist, one or more psychiatric social workers, and a secretary. Each child referred to one of these clinics is given a physical examination and psychological tests, and all the factors of his problem, including his family and environmental circumstances, are thoroughly studied, and his adjustment is skill-

fully worked out.

In addition to conducting these two traveling clinics, the National Committee for Mental Hygiene is also cooperating in the maintenance of a psychiatric clinic in Monmouth County, N. J., which has to do largely with pupils in rural schools.

Another section of the Program provides for demonstrations of visiting teacher work. Seventeen cities now have the services of such teachers made possible through the Public Education Association of New York and the affiliated National Committee on Visiting Teachers. The visiting teacher assists principals and teachers in finding out why children are educational or behavior problems and in planning ways to help them. The selection of cities for these demonstrations is dependent upon the fulfillment of certain conditions, one of which is that a portion of the salary of the visiting teacher is paid by the local community.

Still another section of the Program provides training for visiting teaching and psychiatric social work in the New York School of Social Work, where annual fellowships have been established. The School maintains the Bureau of Children's Guidance, which handles intensively problem children from a number of New York public schools, and provides the students in the New York School of Social Work with opportunities for observation and practical experience.

The fourth section of the Program is the work of the Joint Committee on Methods of Preventing Delinquency, at 50 East 42nd Street, New York City, which has been established to give unity to the effort, to conduct related studies, and to interpret through publications the work of the Program.



Bituminous Treatment for Playground Surfaces

By George E. Martin

PROPER construction for the playground area around school buildings is often a difficult problem. The ordinary soil left after the construction of the building is wet in rainy weather and very dusty in dry weather. Gravel and sand are in quite good condition in wet weather, but become very disagreeable during a long season of drouth. Untreated cinders act very similarly to sand and gravel. Hard pavements of concrete and similar material are objectionable not only because of excessive cost, but also because of the possibility of serious injury to children playing on them. The city of Milwaukee and some of the suburban towns surrounding it have solved this problem by constructing playgrounds of cinders and treating them with bituminous binder.

The first work of this sort was done around the schoolhouse in Shorewood, a suburb immediately adjacent to the city of Milwaukee. This work was done in 1918. The playground was constructed by spreading 4 inches of clean screened cinders over the surface of the subgrade. The cinders were then rolled thoroughly with a 5-ton tandem roller. One and one-half gallons of binder per square yard was then applied in three parts, using $\frac{1}{2}$ -gallon to each application. The binder was permitted to dry out between successive applications, this taking approximately 24 hours. After the last application, clean stone chips, ranging in size from $\frac{1}{4}$ -inch to $\frac{1}{2}$ -inch, were used as a covering material, and a slight sprinkling of sharp sand was placed on the top to fill up the surface

voids. The construction was then thoroughly rolled and allowed to set up for two or three weeks before being used. This playground has been in continuous use since 1918, both summer and winter, and is in good condition at present, as can be seen from the photograph. In the space directly underneath the swings there have been a few holes in the surface treatment, but these are easily repaired. It is probable that the entire playground will be given a surface treatment with a light application of binder within the next year.

The city of Milwaukee constructed a bituminous treated cinder playground at the Grand Avenue & 27th Street school in 1921. This construction was as follows:

From 6 to 8 inches of unscreened cinders was spread over the subgrade. The cinders were harrowed three times in order to get the finest cinders to the bottom and the coarser ones on the top. After harrowing, the cinders were rolled with a 12-ton, 3-wheeled roller. Tarvia B was then used in one application at the rate of $1\frac{1}{2}$ gallons per square yard. This was followed by a thin layer of $\frac{3}{4}$ -inch stone, with a second layer of $\frac{1}{4}$ -inch to $\frac{1}{2}$ -inch stone to fill up the surface voids. The cover was rolled in thoroughly with a 12-ton, 3-wheeled roller. The playground was allowed to set up for about ten days before being used. It was used constantly during the school year of 1921-22, and is now in fine condition. In a few places coal or other material has been hauled over the surface of the playground; and while this has rutted it somewhat, the surface is unbroken.

Municipal Lawn Tennis Increasingly Popular

By Dwight F. Davis

President, United States Lawn Tennis Association

RECENT data relative to municipal tennis in a number of cities throughout the United States show that a wonderful work is being undertaken for the physical development of the youth of these cities and that tennis is one of the principal vehicles of recreation toward this end. The statistics indicate that, while rapid progress is being made in this direction, the demand for court space in most of the cities considered is still far in advance of playing space and equipment.

Some 75 cities widely separated and located in all portions of the United States report that in 375 parks or recreation centers there are a trifle more than 2,000 tennis courts at the present time. A vast majority of these courts are clay, dirt or gravel. Less than 200 of the 2,000 are concrete, asphalt, etc., and the majority of such courts are located on the Pacific Coast and far south where thunderstorms are frequent. The advantage of courts of this type is that they drain quickly after such storms and are playable within ten or fifteen minutes following the cessation of rain.

More than 50 per cent of the cities furnishing these statistics report new courts planned for 1923, and, based on their figures, the addition in round numbers will be close to 400 courts. Of the 75 cities mentioned, but 28 require a permit to play on the courts, and but 4 of them charge any fee for these permits. Of these 4 cities charging for permits, Greater New York and its boroughs supply 50 per cent.

Twenty-five of the cities furnish instructors who teach at least the rudimentary forms of stroke and methods of play to the children. All but 16 of the 75 cities supply nets with the courts free, and all but 7 provide permanent backstops. Thirty-six cities during 1922 held some form of a park championship, and the total number of players competing in such championships

was slightly in excess of 22,000. Thirty-four of the 36 cities furnished prizes; most of these were donated and took the form of ribbons, medals, a city letter somewhat on the order of a 'varsity letter, etc. Very few cities report that an entry fee was charged. In the case of Brooklyn, the 25-cent entry fee was used to purchase prizes.

Reports also show that in 42 cities where records were kept, 1,785,711 players used the courts during 1922. This of course is assumed to cover players who used the courts several times at least during the season. Some of the cities and the number of courts they reported are as follows:

Boston	25	Milwaukee	41
Brooklyn, N. Y.	380	Newark	120
Cincinnati	35	New Orleans	34
Dallas	28	St. Louis	72
Dayton	38	St. Paul	69
Denver	32	San Francisco	25
Detroit	53	Seattle	78
Fort Wayne, Ind.	32	Spokane	35
Kansas City	92	Washington, D. C. ...	68

Of Brooklyn's 380 courts, approximately 300 are grass, these being laid out on the meadowland of the parks.

Some of the outstanding features include the loaning of balls and rackets to children who cannot afford to purchase them, by the San Francisco Park Authorities; the lighting and use of the courts until midnight at Pasadena; two indoor courts used the year round at Memphis; and a constantly increasing interest in the game, with a resultant demand for more courts. This is true of every section of the country, and the reports show that the more progressive cities are using large sums of money in an endeavor to meet these requirements.

Development of lawn tennis among the boys and girls of the nation, particularly that section of the younger generation which plays the game in the parks, municipal playgrounds and recreation fields of the larger cities, will be one of the outstanding features of the United States Lawn Tennis Association campaign in the coming season. It is the intention to work

in this direction until every city of the country shall provide facilities (such as make St. Louis, Philadelphia, Washington and Chicago outstanding centers of municipal tennis.

To further this desirable cause, the Association proposes to hold a National Championship in 1923, exclusively for park players. A handsome trophy will be awarded the winning player. The Association has also revived the National Interscholastic Championship, and with the National Boys and Junior Championships the way is open for every player, regardless of his school, club or park status, to compete for a national title, provided he has the necessary skill to qualify for the final tournaments.

It is part of the program of the Association to develop the playing skill of the boys and girls in every way possible. One portion of the educational work will be the use of slow motion pictures of some of the leading tournament players of the world. It is proposed to offer the use of the films

to all playground associations and similar organizations for use from a tennis educational standpoint rather than as an amusement feature. No charge will be made for the use of the films and no charge permitted for their exhibition without a special sanction from the Association to meet an exceptional situation. The only expense attached to the use of the film will be the express charges incurred in shipping the reels between the Association's office and the point of exhibition. Applications are now being received and the films allotted in the order of their receipt by the Executive Secretary of the U. S. L. T. A., 120 Broadway, New York City.

In the author's experience as Park Commissioner in St. Louis, it was found that wherever playgrounds were instituted, juvenile crimes and delinquencies were least and that not only the physical but the mental capacities of the boys were the best and their conceptions of good sporting ethics and right conduct the keenest.

A Stimulus to Swimming Pool Cleanliness

IN its *Weekly Health Review* for February 24, the Detroit Department of Health published a table showing the comparative cleanliness of the water in seventeen different pools for a four-months period. The report says, in part:

"This is chilly weather, and yet 15,000 Detroiters are keeping up their physical resistance by taking a swim every week.

"That the full advantages of health may be enjoyed, it is essential that the swimming pools of the city be kept clean. The Health Depart-

ment takes frequent samples of the water for bacterial analysis by which the cleanliness of the water may be judged. The order is determined by averaging the relative position of each pool in the two measures, viz., (1) total bacterial count, and (2) colon count (a more specific index of pollution).

"The bacterial content of the pool is dependent on the number of bathers, their cleanliness, the equipment for cleaning and sterilizing the water, and the care given the operation of this equipment. Much improvement could be effected in the last eight pools in the table with closer attention to these details."

Campaigns to Reduce Automobile Accidents

AN anti-auto accident campaign, directed against reckless drivers and careless pedestrians, has been initiated in 50 cities, according to announcement by the National Safety Council, of Chicago.

Cities in which civic, municipal and business interests are being organized through local safety councils to curb carelessness in the streets are:

Boston, Mass., Bridgeport, Conn., Buffalo, N. Y., Chicago, Ill., Cleveland, Ohio, Dallas, Texas, Wilmington, Del., Detroit, Mich., Oakland, Calif., East St. Louis, Ill., Erie, Pa., Everett, Wash., Flint, Mich., Grand Rapids, Mich., Spokane, Wash., Kansas City, Mo., Allentown, Pa., Bethlehem, Pa., Louisville, Ky., Milwaukee, Wis., New Bedford, Mass., Portland, Ore., Pawtucket, R. I., Philadelphia, Pa., Providence, R. I., Rochester, N. Y., St. Louis, Mo., St. Paul, Minn., Seattle, Wash., Sioux City, Ia., South Bend, Ind., Springfield, Ohio, Granite City, Ill., Waterbury,

Conn., Worcester, Mass., Pittsburgh, Pa., Washington, D. C., Butte, Mont., Columbus, Ohio, Toledo, Ohio, New Haven, Conn., Baltimore, Md., Trenton, N. J., Albany, N. Y., Des Moines, Ia., Minneapolis, Minn., Richmond, Va., Denver, Colo., Cincinnati, Ohio, and Springfield, Mass.

Safe drivers schools and clubs, public school safety patrols for motorists and pedestrians, traffic regulations, enforcement of penalties against reckless drivers, and vigilante traffic squads are among the measures adopted in the various cities to protect citizens on the streets. Vigilante traffic squads composed of business men organized under police direction are now functioning in many cities, among them Louisville, Ky., Grand Rapids, Mich., Allentown, Pa., Kansas City, Mo., Portland, Ore., Bridgeport, Conn.



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greatest oil, lumber and mining companies, the most experienced engineers, contractors, road builders, public officials, farmers and ranch owners, in over 75 different countries, look to Holt to supply the most effective means of doing tasks too difficult and too important to entrust to any method or machine but the "Caterpillar."* This world-wide demand has made the Holt Company what it is today, built the great Holt factories, girded the world with Holt service stations. It has made "Caterpillar"* a synonym in every tongue for *power, traction and economy*. Write for our booklet, "Caterpillar"* Performance.

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The City's Legal Rights and Duties

Information for City Attorneys and Other Municipal Officers, Summarizing
Important Court Decisions and Legislation

Conducted by A. L. H. Street, Attorney at Law

Validity of State Aid to Municipal Coast Improvements

The Texas Legislature passed a law in 1920 "to aid the city of Aransas Pass in constructing and maintaining sea-walls, breakwaters and shore protections in order to protect said city from calamitous overflows, by donating to it eight-ninths of ad valorem taxes collected on property and from persons in San Patricio County [county in which the city is situated] for a period of twenty years." The act authorized issuance of bonds to supplement this state aid. The validity of this law was lately challenged in a mandamus proceeding brought by the city against the Attorney General, but it was upheld in an opinion handed down by the Texas Supreme Court January 24, 1923.

The opinion holds that the law does not unconstitutionally amount to a grant of public money or state credit to a municipal corporation, and that it does not impinge upon the local constitutional prohibition against appropriations for more than two years. In the course of its opinion the Court said:

"The people of the state at large have a direct and vital interest in protecting the coast cities from the perils of violent storms. The destruction of ports, through which moves the commerce of the state, is a state-wide calamity. Hence, sea-walls and breakwaters of the Gulf coast, though of special benefit to particular communities, must be regarded as promoting the general welfare and prosperity of the state."

Validity of Bonds Given by Municipal Officers and Employees

Concerning the validity of bonds given by municipal officials and employees, not strictly conditioned according to the law or ordinance under which they are executed, the Kentucky Court of Appeals says in the case of *Sauer vs. Fidelity & Deposit Co. of Maryland*, 234 Southwestern Reporter, 434:

"Neither the principal nor the surety can complain of the omission from the bond of the covenant that the principal will pay over all moneys that may come to his hands to the persons to whom same belong, as they cannot be heard to complain that the obligations of the bond are less than prescribed by the statute. The great weight of common-law authority is to the effect that a statutory or official bond is not void because it contains a covenant or condition which is not prescribed by the statute, although the statute in pursuance of which it is executed prescribed its terms and conditions, unless the statute expressly provides that it shall be void on that account. The general rule is that, unless the statute expressly provides, only those parts of the bond which are contrary to the provisions of the statute are void, and the rest of the conditions will stand and be enforceable."

Invalidity of Purchase Contracts in Which Councilmen Are Adversely Interested

A city charter providing that members of the council shall not be interested in any contract with the city, invalidates purchases of coal by the city, where, at the time the contract was made and the coal furnished, a paid employee of the coal company was a member of the city council, though, on account of war conditions, the city was unable to obtain coal elsewhere. (*Kentucky Court of Appeals, Byrne & Speed Coal Co. vs. City of Louisville*, 224 Southwestern Reporter, 883.)

Municipal Improvements May Contemplate Future Necessities

Observations by the Wisconsin Supreme Court, although applied specifically to the powers of a metropolitan sewerage commission acting under statutory authority in providing for disposal of sewage of a district comprising both the territory of the city of Milwaukee and adjacent territory, seem to apply broadly to all public improvements opposed on the ground of lack of individual benefits in some instances to taxed property. (*Thielen vs. Metropolitan*



A Barber-Greene loading snow

Windrows of scarified macadam and dirt are loaded with a Barber-Greene in Nashville, Tenn.

Revolutionizing city paving methods

How the Barber-Greene Loader keeps down labor costs in summer—and replaces 60 snow shovelers in winter

LAST YEAR Nashville, Tennessee, removed the macadam from a certain street, and graded down the road bed an average of twelve inches in order to lay concrete pavement.

The scarified macadam and earth were plowed into windrows and a Barber-Greene Loader was put to work loading them into trucks.

In one day the Loader cleaned up 1,455 square yards of road by loading 485 cubic yards of material.

The average was 250 cubic yds. per day counting in the stops due to bad weather and the like.

The superintendent of the job writes: "We are revolutionizing city paving methods here by the use of this Loader. We have revamped our old ideas about the proper co-ordination of scarifier, scraper and trucks, and now we are the envy of contractors who have come to inspect our work."

The same Barber-Greene is also used to load gravel directly from the bank to trucks and on

this work cut the overhead per yard 66% — and saved 25 shovelers.

With the present scarcity and high cost of common labor, savings like these appeal strongly to municipalities in all parts of the country.

Many already have Barber-Greenes and others are purchasing their first one this year.

The Barber-Greene Bucket Loader can be furnished with a removable boom so that it can be converted into a Barber-Greene Snow Loader in the winter.

Albany says that the Barber-Greene is over thirty times as fast as hand labor in loading snow; Chicago says that it replaces sixty shovelers; Boston L officials say that counting the saving in truck time, the Barber-Greene is equivalent to a crew of one hundred and fifty men.

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Sewerage Commission, 189 Northwestern Reporter, 484.)

A lower court found from evidence offered that a portion of the sewerage district territory consists largely of farming communities with no large factories, and that there was no present need of intercepting sewers. It was therefore argued, in opposition to the improvement, that no benefit would accrue to such property, and hence there could be no valid taxation of the property of the improvement. But the Supreme Court said:

"We do not think the conclusion reached by counsel necessarily follows from the facts stated in the finding. It is conceded that the territory in question is suburban in character. The Court found that the metropolitan sewerage commission considered the past, present, and prospective future growth and development of the cities, villages, and industries in the sewerage district and considered the necessity of planning and constructing a system of intercepting sewers which would be reasonably sufficient in size and capacity to care for and handle the prospective needs of the district, and that in so doing the commission exercised their best judgment and acted in good faith. How can it be said that no benefit accrued to the property owners in the territory to be served by the proposed sewerage system? It may well be that the benefits will be more immediate and direct in some cases than in others. It is plain that to construct a system which would be sufficient to provide for present needs would be little short of folly. When the great intercepting sewers are once constructed, their capacity cannot be enlarged excepting by rebuilding them at enormous expense or paralleling them with a second system. The Legislature required that provision be made so that, as additional use develops by reason of the extension of manufacturing districts or increasing density of population, it may be provided for at a minimum of public expense. Looking at the matter in the light of experience, and taking into consideration the reasonable probabilities of the future, it must be said that the property embraced in the sewerage district receives a present benefit which fully justifies the exercise of the taxing power in this case. That matters of this kind should be dealt with in a large, comprehensive way rather than in detail and piecemeal as the imperative necessity arises seems apparent on a moment's consideration."

Cities May Alienate Property Not Needed or Used for Public Purposes

Concerning the right of a city to dispose of real estate owned by it, the Virginia Supreme Court of Appeals remarked in the recent case of *City of Williamsburg vs. Lyell*, 112 Southeastern Reporter; 666:

"Property owned by a city for governmental

purposes and appropriated for the public use is impressed with a trust and cannot be disposed of, except by valid legislative authority. As a general rule, however, a municipal corporation, unless restricted by its charter, or by statute, has the power not only to acquire property, real and personal, but, where not appropriated for the public use, may alienate the same just as other corporations or individuals might do. . . .

"Where property is acquired or held for a special purpose, as soon as that purpose is served, and the corporation has no further use for the property, it may be converted to another use, or disposed of by the municipality. *Newell v. Hancock*, 67 N. H. 244, 35 Atl. 253.

"The city of Ft. Wayne, Ind., purchased a tract of land for a park, but, before it was actually dedicated to the public, conveyed part of it to a railroad company for a yard and shops. The Court in passing upon the validity of the deed upheld it on the ground that the property, although purchased for a public common, had not yet been dedicated. *Ft. Wayne v. Lake Shore & Mich. Southern R. Co.*, 132 Ind. 558, 32 N. E. 215, 18 L. R. A. 367, 32 Am. St. Rep. 277."

Right to Abolish Municipal Office Before Incumbent's Term Expires Is Recognized

As an incident in altering a city's form of government, a state legislature may, subject to constitutional limitations, abolish old offices, holds the Florida Supreme Court in the case of *City of Jacksonville vs. Smoot*, 92 Southern Reporter, 617. In passing, the Court notes that "even when an officer, by reason of having been appointed for a definite term or by special statutory provision, cannot be lawfully removed except for cause after a full hearing, his office may be summarily abolished when the proper municipal authorities deem it advisable."

So, it was decided that on the Legislature's providing for the government of the city of Jacksonville under the commission form, with power vested in the commissioners to distribute the powers previously exercised by the commissioner of public works among such officers, department heads, clerks, etc., as the commissioners might deem necessary, the office of commissioner of public works was abolished, terminating the incumbent's right to further salary, despite the fact that the year for which he had been appointed was unexpired.

Cities Have Power to Establish Hospitals Under a General Welfare Clause in Their Charters

Upholding the right of defendant city to establish and maintain a hospital under the

Setting new records in handling material

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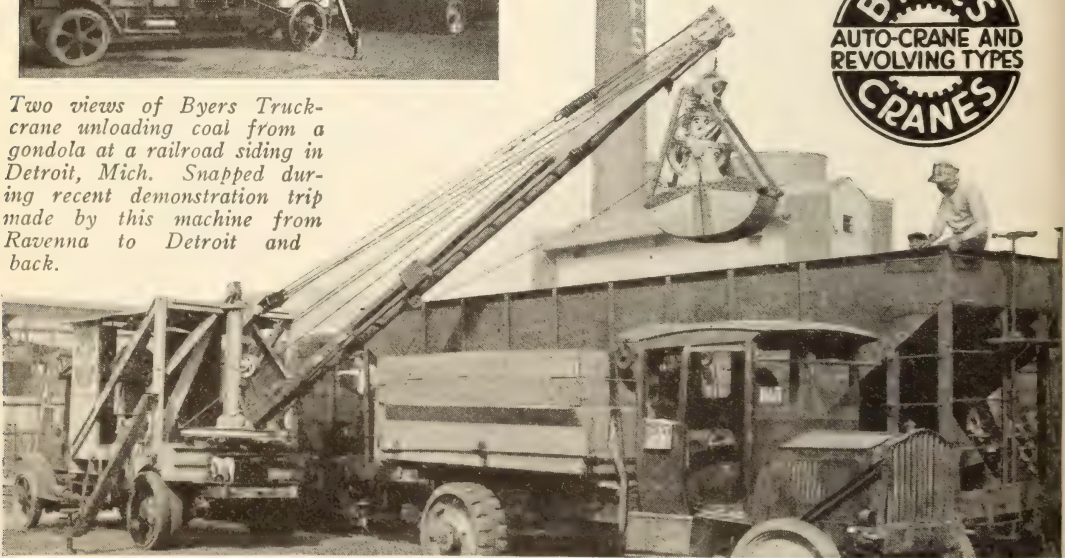
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Two views of Byers Truck-crane unloading coal from a gondola at a railroad siding in Detroit, Mich. Snapped during recent demonstration trip made by this machine from Ravenna to Detroit and back.



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general welfare clause of the municipal charter, the Arkansas Supreme Court said in the recent case of Cumnock vs. City of Little Rock, 243 Southwestern Reporter, 57:

"We are also of the opinion that the power to erect a city hospital is a necessary incident of municipal life. In a growing city, a city hospital may be necessary for the preservation of the public health and the care of sick paupers. We can see no difference in principle between the right of a city to erect and maintain a hospital and to erect and use city halls, jails, and the like. Most cities of any considerable magnitude have city hospitals subject to the regulation of its own local authorities. It is true there is express statutory authority to erect them in many of the states, but we are also of the opinion that such authority is essential to carry out the object and purposes of organizing municipal corporations."

City Not Liable for Negligence of Its Police Officers

A municipal corporation is not liable for the wrongdoing or negligence of its police

officers in the discharge of their ministerial duties. So, where a child, endeavoring to cross a street in a city, was prevented, by a long line of automobiles parked, in violation of an ordinance of the city, near the sidewalk from which the child stepped, from seeing in the middle of the street an oncoming automobile, which ran against and killed the child, the city was not liable in damages for the negligence of its chief of police, who was present and made no effort to prevent the violation of the ordinance, and who gave no warning to the child of its danger, although he saw that the child was going to try to cross the street and knew that on account of the parked automobiles it could not see the oncoming automobile that struck and killed it. (Georgia Court of Appeals, Means vs. City of Barnesville, 112 Southeastern Reporter, 739.)

On the Calendar of Conventions

MAY 10.—NEW YORK, N. Y.

National Highway Traffic Association. Annual meeting. President, Arthur H. Blanchard, Engineering Building, University of Michigan, Ann Arbor, Mich.

MAY 11-13.—WASHINGTON, D. C.

International Association of Police Women. Annual conference. Secretary, Miss Mary Fair, Director of Women's Bureau, Toledo, Ohio.

MAY 16-23.—WASHINGTON, D. C.

National Conference of Social Work. Fiftieth Anniversary Session. Secretary, William H. Parker, 25 East 9th Street, Cincinnati, Ohio.

MAY 21-23.—SAN ANGELO, TEXAS.

West Texas Chamber of Commerce. Annual Convention. General Manager, P. A. Whaley, Stamford, Texas.

MAY 21-25.—DETROIT, MICH.

American Water Works Association. Annual convention. Secretary, J. M. Diven, 153 West 71st Street, New York, N. Y.

MAY 21-25.—MEMPHIS, TENN.

Southern Commercial Secretaries' Association. Annual convention. Secretary, A. T. Felt, Alexandria, La.

MAY 24-25.—AMERICUS, GA.

Association of County Commissioners of Georgia. Annual convention. Secretary, Fred Houser, 404 Chamber of Commerce Building, Atlanta, Ga.

MAY 25-26.—MT. VERNON, OHIO

Ohio Commercial Secretaries' Association. Annual meeting. Secretary, Avery G. Clinger, Assistant Secretary, Chamber of Commerce, Columbus, Ohio.

JUNE 4-8.—NEW YORK, N. Y.

National Electric Light Association. Annual convention. Executive Manager, M. H. Aylesworth, 29 West 39th Street, New York, N. Y.

JUNE 11-12.—KILBOURN, WIS.

Wisconsin Association of Commercial Secretaries. Annual convention. Secretary, D. A. Caldwell, Chamber of Commerce, Wausau, Wis.

JUNE 11-14.—HAMILTON, ONT.

Canadian Good Roads Association. Annual convention. Secretary, George A. McNamee, 909 New Birks Building, Montreal, Que.

JUNE 11-15.—BUFFALO, N. Y.

International Association of Chiefs of Police. Annual conference. Secretary, George Black, Chief of Police, Wilmington, Del.

JUNE 12-14.—BUFFALO, N. Y.

Conference of Mayors and Other City Officials of the State of New York. Annual convention. Secretary, William P. Capes, 25 Washington Avenue, Albany, N. Y.

JUNE 18-21.—MINNEAPOLIS, MINN.

Smoke Prevention Association. Annual meeting. Secretary, Frank A. Chambers, Room 704, City Hall, Chicago, Ill.

JUNE 18-21.—WICHITA FALLS, TEXAS.

Southwest Water Works Association. Annual convention. Secretary, R. D. Morgan, Mexia, Texas.

JUNE 19-21.—MILWAUKEE, WIS.

National Association of Comptrollers and Accounting Officers. Annual convention. Secretary, Mark M. Foote, Comptroller's Office, Chicago, Ill.

JUNE 20-21.—FARIBAULT, MINN.

League of Minnesota Municipalities. Annual convention. Executive Secretary, Morris B. Lambie, The Municipal Reference Bureau, University of Minnesota, Minneapolis, Minn.

JUNE 20-22.—BRIDGEPORT, CONN.

New England Association of Fire Chiefs. Annual convention. Secretary, John W. O'Hearn, Fire Chief, Watertown, Mass.

SEPTEMBER 13-21.—BURLINGTON, VT.

The New England Water Works Association. Annual convention. Secretary, Frank J. Gifford, 715 Tremont Temple, Boston, Mass.

OCTOBER 8-13.—BOSTON, MASS.

American Public Health Association. Annual meeting. Secretary, A. W. Hedrich, 370 Seventh Avenue, New York, N. Y.

OCTOBER 23-26.—RICHMOND, VA.

International Association of Fire Engineers. Annual convention. Secretary, James J. Mulcahey, City Hall, Yonkers, N. Y.

OCTOBER 29-31.—CINCINNATI, OHIO.

National Association of Commercial Organization Secretaries. Annual meeting. Secretary-Treasurer, Joseph F. Leopold, 301 Crocker Building, Des Moines, Iowa.

NOVEMBER 12-16.—MEMPHIS, TENN.

American Society for Municipal Improvements. Annual convention. Secretary, Charles Carroll Brown, P. O. Box 234, St. Petersburg, Fla.

NOVEMBER 18-15.—WASHINGTON, D. C.

City Manager's Association. Annual convention. Secretary, John G. Stutz, Lawrence, Kans.

BEST TRACTORS

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"We have two BEST 'Thirty' TRACTORS and two of the 'Sixties.' I find the BESTS the *most economical* that I have ever used for road maintenance as well as for construction work. I use ours for all kinds of road work and am widening lots of narrow roads at a very small cost," says a user* of BEST TRACTORS.

* Name of this user will gladly be sent on request.

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The Municipal Bond Situation

By Sanders Shanks, Jr.

Editor, *The Bond Buyer*

THE bond market is evidently not going to be as kind to municipal borrowers this year as it has been in other years. Just as the spring crop of county, city, town and other municipal bonds arrives, the market runs into a period of dullness such as has not been seen in a long time, and market prices take a turn for the worse.

April was a bad month from the standpoint of municipal borrowers. In spite of a marked decrease in the amount of new issues put on sale this year, as compared with 1922, a general reduction in selling prices was resorted to by dealers last month in an effort to stimulate the appetite of investors. But even such concessions as have been made have met with little response, with the result that the bankers who handle municipal issues have had to adopt a very cautious attitude with respect to the underwriting of any new issues.

Two important pieces of public financing scheduled for about the middle of April illustrate the point. The state of Iowa invited bids for \$22,000,000 Soldiers' Bonus 4¼ per cent serial bonds having an average maturity of about ten years. The sale was to take place on April 16. On the same day Los Angeles, Calif., was to open bids for \$4,500,000 4½ per cent bonds. When attention was first called to these offerings early in the month, it seemed clear that both issues would command premiums. By the time the sale date was reached, however, the market had fallen to the point where neither issue was attractive at par and, because of legal restrictions, bids below par could not be considered. These issues are both attractive, but the coupon

rate will have to be raised to effect a sale in the early future.

There has been a decided decrease in the number of issues placed on the market this year, as compared with the first four months of 1922. The total of each of the first three months of this year was noticeably smaller than each preceding month. The approximate amount of the flotations in April was \$68,000,000, while in March there were \$69,758,008 bonds sold; in February, \$77,883,068, and in January, \$98,454,989, making a total of \$314,096,065. The aggregate of the same period in 1922 was \$439,984,493. The larger issues floated during April, which were sold at prices ranging from 4.03 to 4.43 per cent, are listed in the table below:

In addition to the Iowa bonds which will have to be reoffered, Kansas has a \$25,000,000 Soldiers' Bonus issue which has received the approval of the Supreme Court and is ready for market; and Illinois, with a \$55,000,000 loan for the same purpose, may also call for bids in the near future.

Looking at the situation from the viewpoint of the municipal official, the interesting fact at this writing is that the market is readjusting to a price level of from one-quarter to three-quarters of one per cent (in net interest cost) higher than the level of the first quarter of the year. This should be carefully considered by bond-issuing authorities in order that coupon rates of interest may be fixed to meet the market rate, thus avoiding delay in effecting sales which, in many cases, might tie up a construction program and entail losses greater than the difference in the interest cost of the loan.

SOME IMPORTANT MUNICIPAL BOND ISSUES FLOATED DURING APRIL

Amount	Place	Maturity	Rate (%)	Net Yield (%)
\$840,000	Syracuse, N. Y.....	1924-43	4 & 4¼	4.03
600,000	Erie Co., Pa.....	1928-36	4½	4.10
439,000	Woodlawn, Pa.	1929-53	4¼	4.19
1,685,000	Newark, N. J.....	1924-52	4½	4.30
632,000	Newark, N. J.....	1924-63	4½	4.28
450,000	Hagerstown, Md.	1964-86	4½	4.33
1,065,000	Fall River, Mass.	1924-53	4, 4¼ & 4¾	4.37
2,000,000	Denver, Colo.	1934-53	4½	4.38
6,394,000	Baltimore, Md.	1924-57	4 & 5	4.38
1,170,000	Toledo, Ohio	1924-47	4½ & 4¾	4.43

Cut Haulage Costs

In every department of municipal work—in handling asphalt, garbage, gravel, coal, ashes, cement, stone, —Wood-Detroit Hydraulic Hoists and Steel Bodies are cutting haulage costs.

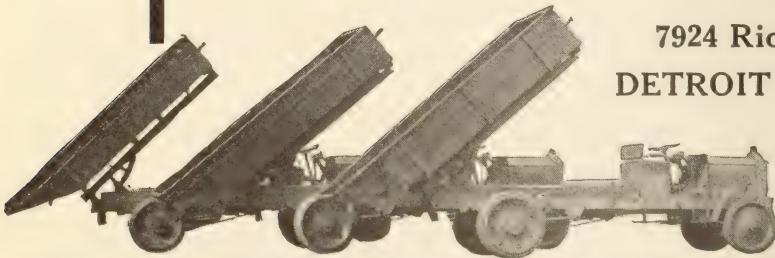


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Hints, Helps and Happenings

Commission-Manager Government for New Jersey Cities

AFTER several years of effort, approval has at last been secured from the New Jersey Legislature of an optional act for the commission-manager form of government. The success of the recent effort is credited in large measure to the New Jersey League of Women Voters.

The new law is permissive for all municipalities. The governing board is designated as the "Municipal Council," and consists of three members in places of less than 25,000 inhabitants, five members in places of from 25,000 to 100,000, and seven members in places of over 100,000. The municipal council appoints the city manager (or "municipal manager," as he is designated in the act), and also an assessor, a municipal auditor, a municipal treasurer, a municipal clerk, and a municipal attorney. The councilmen hold office for four years, subject to the recall. The manager holds office "as long as he shall perform the duties of his office to the satisfaction of the municipal council."

The Decline of Typhoid Fever in the United States

AGRATIFYING record—that of 1922 regarding the typhoid fever death rate: 18 cities among the 69 of 100,000 and over with a rate of 2 or less per 100,000; 3 of these with no deaths from this disease; and 7 with a rate of from 1 to 0. In all but 5 of the 69 cities the typhoid fever death rate was less than 10. These figures are made public by the *Journal* of the American Medical Association

in its eleventh annual survey of typhoid fever in the larger cities of the United States. The second of the ten tables published by the *Journal* covers the record of 57 cities from 1910 to 1922 inclusive, and shows that with a population increased from 21,000,000 to 27,000,000 in that period, the typhoid deaths decreased from 4,114 to 851, and the typhoid death rate per 100,000 from 19.59 to 3.15. Sanitary engineers and public health officers will find these gains stimulating to continued effort along lines of work thus proved successful.

Tokyo Traffic Rules Trumpet Melodiously

The following rules of the road, said to be copied literally as posted in the Central Police Station of Tokyo, have been made public by Chief City Magistrate William McAdoo of New York:

1. At the rise of the hand policeman stop rapidly.
2. Do not pass him or otherwise disrespect him.
3. When a passenger of the foot hove in sight, tootle the horn, trumpet at him melodiously at first, but if he still obstructs your passage, tootle him with vigor and express by word of the mouth the warning "Hi, Hi."
4. Beware the wandering horse that he shall not take fright as you pass him by. Do not explode an exhaust *bow* at him. Go soothingly by.
5. Give big space to the festive dog that shall sport in the roadway.
6. Avoid entanglement of dog with the wheel spokes.
7. Go soothingly on the grease mud as there lurks the skid demon.
8. Press the brake of the foot as you roll round the corner to save collapse and tie-up.

The rules were brought back by the Rev. Dr. Karl Reiland, Rector of St. George's Church, New York, who has been visiting in Japan. Dr. Reiland writes to *THE AMERICAN CITY*:

"I have assumed that this is a translation from the Japanese made by a Japanese, but I cannot be certain. It seems to indicate faithfully the courtesy and poetic and pleasing method of expression known to be incident to the nature of the Japanese."

Tax Exemption Decision Reversed in New York State

THE Appellate Division of the New York Supreme Court has reversed the ruling of Justice Tierney, who, as reported in the April number of *THE AMERICAN CITY*, had declared unconstitutional the state law allowing temporary tax exemption of new dwellings. On the strength of this decision upholding the constitutionality of tax exemption for emergency housing, the New York Legislature has extended to April 1, 1924, the period in which new buildings may be started and exempted from local taxes.

Motor Vehicle Taxation

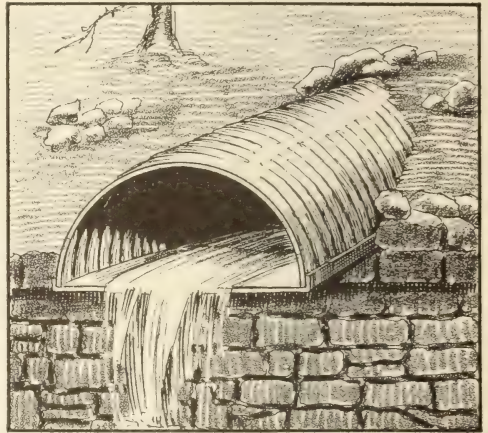
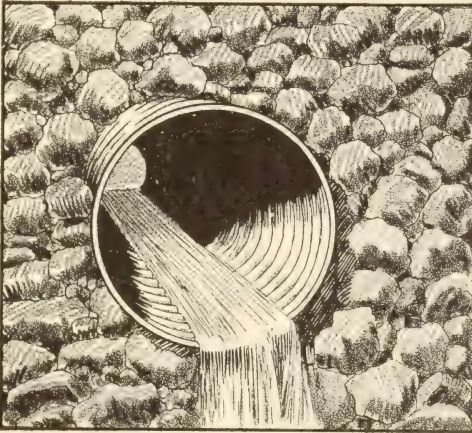
LIMITATION of taxation on automobiles to the amounts necessary for the maintenance of improved highways and the administration of state motor vehicle departments, with the state as the sole taxing agency, are advocated in the report of the Motor Vehicle Conference Committee, on which are represented the American Automobile Association, the Motor and Accessory Manufacturers Association, the National Automobile Chamber

GENUINE OPEN-HEARTH IRON

RUST-RESISTING

CULVERTS

The high quality of the material used and the adaptability of Newport round and half-round types of corrugated culvert pipe, to the needs of the road builders, make NEWPORT GENUINE OPEN-HEARTH IRON corrugated metal culverts the standard for road work everywhere. The iron has had the impurities eliminated to an extent not usually reached in any other grade of pure iron. This makes the culverts rust-resisting and the corrugations give them strength, thus assuring the road master or engineer that he is buying a high-grade culvert.



Newport culvert pipes of round, riveted, full-circle construction, are the strongest corrugated metal culverts manufactured. They are easily installed and last a lifetime. The half-round flat-bottom culvert pipe is particularly adapted to city use. It is made in 2-foot lengths so that whenever a pipe becomes clogged it is easy to dig down and lift the section immediately above where the clogged condition exists, clean out and replace it with no necessity of interfering with traffic or the expense of digging up the whole pipe.

NEWPORT CULVERT CO.

542 West Tenth St.,

Newport, Kentucky

of Commerce, the National Automobile Dealers Association, and the Rubber Association of America. Representatives of these five great national organizations, after a careful study of the taxing situation in all parts of the United States, declare that federal, state, and municipal lawmakers and governing bodies are turning to motor vehicle manufacture, sale and use as fertile fields for raising a big share of the annual revenues needed to finance governmental activities, and in doing this are placing special taxes on the automobile, which are rarely based upon sound theories of economics or equity.

The Committee, in discussing gasoline taxes, declares that gasoline consumption is a fairly accurate and practicable measure of highway use and that a tax upon this fuel constitutes a fair method of taxation, provided it is not imposed as a super-tax on all the other taxes that the motorist is now required to pay. It is pointed out that its extension should be opposed unless the annual proceeds as a single tax, or in conjunction with other taxes, are made to conform to the amount which properly and equitably should be levied upon the motor vehicle.

The main consideration, the Committee report concludes, is that, irrespective of the particular form of special taxation any state may adopt, the all-important thing is that the aggregate amount of these special taxes upon motor vehicles in any one year shall not be more than is necessary to maintain the improved highways of the state.

Flowers for the Sick and the Poor

SUBURBANITES on the lines entering the Grand Central and Pennsylvania stations in New York will have a daily opportunity this summer to share their flowers with the city's sick and poor. The National Plant, Fruit & Flower Guild, of 70 Fifth Avenue, New York, in cooperation with the United Neighborhood Houses, has announced that beginning May 1 booths will be opened in both terminals at which flowers may be left for distribution to the less fortunate dwellers in the crowded districts.

THE AMERICAN CITY will be glad to hear of similar opportunities afforded by civic or philanthropic agencies in other cities for the distribution of the products of garden and field to the flowerless sections of our large cities.

Is any organization in your city performing this fine service?

Memorial Day Not the Time to Plant Trees

THE AMERICAN LEGION WEEKLY has been doing a good service in calling attention of the Legion posts to the fact that Memorial Day is the time to *dedicate* rather than to *plant* memorial trees. For most sections of the United States May 30 is too late in the spring to plant trees. If the trees have not already been planted, it would be much wiser to postpone the planting until the fall, and dedicate the trees with fitting ceremonies on Memorial Day of 1924.

Where trees have already been planted, good citizenship requires that they be given proper care. To emphasize this need, the *Weekly* publishes the following letter from an anonymous Legionnaire in Grand Rapids, Mich.:

"While you're talking about memorial trees in the *Weekly*, why don't you warn the gang against letting memorial trees die after they've been planted? I know a town where a whole row of memorial shade trees has been allowed to die. It would have been far better for that town if the trees had never been planted. Proper care would have prevented the death of

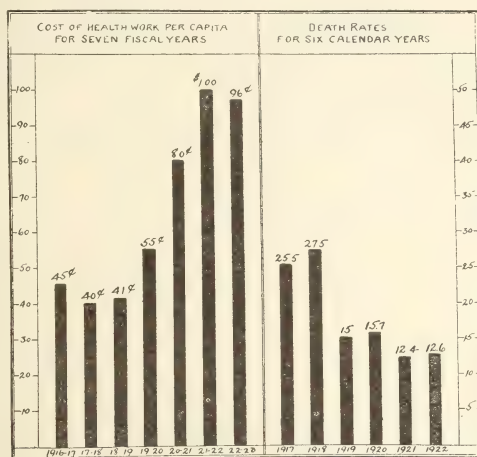
nine-tenths of the trees, I am sure."

For Clean Outdoor Amusements

THE much-needed agitation against objectionable outdoor shows has at last begun to bear fruit. At the suggestion of ten showmen there has been organized the Showmen's Legislative Committee of America, with executive office at 155 North Clark Street, Chicago. A letter from the committee on March 28 states that Attorney Thomas J. Johnson of Chicago has been chosen General Counsel and Dictator; that "Mr. Johnson's prosecution of the undesirable elements and features in the outdoor show world will be relentless"; and "from his decision there will be no appeal."

Two Women City Managers

THAT the men are not to have a monopoly of managing municipal affairs in the smaller cities is evident from the recent appointment of two women as city managers—Mrs. Bertha Heidenfelder in Collinsville, Okla., and Mrs. R. E. Barrett in Warrenton, Ore.



As the amount of money invested in health work has increased the death rates have decreased—a well known health authority says "public health is purchasable."

A CHART WHICH TELLS AN INSPIRING STORY
From the last annual report of the Department of Health, Winston-Salem, N. C.



Batavia Road, Hamilton County, Ohio, "Tarvia-X" penetration in 1914. Two treatments with "Tarvia-B" practically only maintenance in 9 years.



Tarvia Maintenance Truck spreading "Tarvia-B"

Economical Construction and Economical Maintenance

What every Taxpayer desires is the *most miles* of good roads possible with the available road funds. That means economical construction *plus* economical maintenance. It means not only roads that can be built at moderate cost but roads that can be kept in good condition at small expense.

Tarvia Roads squarely meet both of these requirements.

For Tarvia Roads cost only a little more to build than plain, waterbound macadam. And with inexpensive Tarvia maintenance there is practically no limit to their life. Smooth, dustless and mudless all the year 'round, Tarvia Roads are actually improved by time and traffic. In addition to these

facts the granular surface of a properly constructed and properly maintained Tarvia Road prevents skidding.

Batavia Road, Hamilton County, Ohio, shown above, is a typical example of Tarvia good-road economy. Since its construction in 1914, this road has stood up under a heavy volume of traffic. The only upkeep has been two inexpensive surface treatments with "Tarvia-B"—one in 1918; the other in 1921. Today the road is in perfect condition.

There is a grade of Tarvia for every road purpose—as a binder in new road construction; for maintaining gravel and macadam roads; for re-surfacing, patching and repairing improved roads of all types.

Tarvia

*For Road Construction
Repair and Maintenance*

Special Service Department

This company has a corps of trained engineers, and chemists who have given years of study to modern road problems. The advice of these men may be had for the asking by anyone interested. If you will write our nearest office regarding road problems and conditions in your vicinity, the matter will be given prompt attention.



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What Southern City Wants a Child Health Demonstration?

MUNICIPALITIES of less than 30,000 population and rural districts south of the Mason-Dixon line and east of the Mississippi are eligible for the second of the three child health demonstrations which are to be financed in different parts of the United States by the Commonwealth Fund.

The general purpose of these demonstrations is to aid the communities chosen in their efforts to save the lives of mothers and babies, and to help their boys and girls develop into strong, sturdy citizens, with a wholesome outlook on life. Each demonstration will last for five years, during which it will concern itself with every phase of child life.

It is suggested that cities interested correspond immediately with the Child Health Demonstration Committee, 370 Seventh Avenue, New York.

Teaching Safety to Drivers

UNDER the direction of John Prince, of the Kansas City Safety Council, there is being carried on in Kansas City, Mo., a school for drivers of motor cars, the primary purpose of which is to teach safety. The attendance on the first five Monday nights during which the course will run was between 400 and 500. The school is being held in the auditorium of the Manual Training High School.

A similar school is being held for women at the Jack O' Lantern Tavern at Westport Avenue and Main Street, on Tuesday afternoons. The attendance at the first meeting was 300. The members of the class included not only those who own cars, but others who are planning to buy during the season. The schools are only a part of an educational program to induce the people to think and talk safety.

Forecast of Municipal Building Expenditures for 1923

ANATION-WIDE survey of the contemplated expenditure for public buildings by municipalities during 1923, recently conducted by S. W. Straus & Company, of New York, showed that 92 cities had planned to spend more than \$260,000,000 for schools, police, fire and various other administration buildings. More than a score of other important cities will probably add public appropriations soon, bringing the total for less than 120 cities up to approximately \$350,000,000,

and even this is likely to be increased before the year closes.

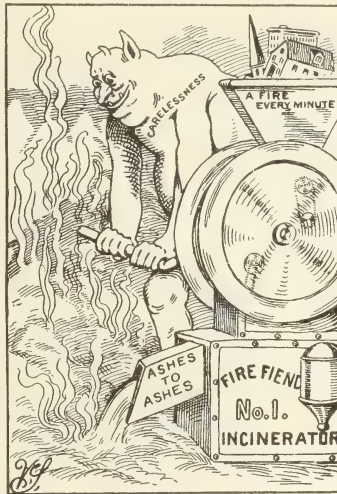
The sum reported by the 92 cities is exclusive of the amounts to be spent for buildings in various cities by the Federal Government. Among the 92 cities reporting, 51 will expend during the year more than \$1,000,000 each on public construction, and 14 will spend more than \$5,000,000 each.

Zoning for Iowa and Chicago

JUST as this issue of THE AMERICAN CITY is going to press, word is received of the adoption during April of a zoning enabling act by the State Legislature of Iowa, and of a comprehensive zoning ordinance by the City Council of Chicago, Ill.

The Iowa act is an almost verbatim copy of the model act proposed by the National Advisory Committee on Zoning. The Chicago ordinance, while containing, of course, many excellent features, has been strongly criticized in some respects by the Chicago Real Estate Board, the Chicago Association of Commerce and other important civic bodies.

More extended comment on these two pieces of legislation will be published in our June number.



The Daily Grind

In this startling composite portrait, used by courtesy of "Whittlings," we recognize our criminal selves

A City-Planning Prize Offer

A PRIZE of \$250 has been offered by Frank B. Williams of New York City to students of Harvard University for the best essay of not more than 3,500 words on the following subject. "The Laws and Regulations Relating to Platting of Land in the United States as Affecting the Desirability of Lots for Dwelling Purposes." To the essay may be appended material such as tables, diagrams, plans, bibliography, indexes, etc., not exceeding in all 3,000 words or its equivalent in pages. Two or more competitors may collaborate, the prize to be divided among them in case they are successful. The essay should be typewritten and signed with a fictitious name, and should be accompanied by a sealed envelope containing the name and address of the competitor or competitors. They should be sent to Albert S. Bard, 25 Broad Street, New York, N. Y., so as to reach him on or before June 1, 1923. The competition is open to students in any department of the University and to men who have graduated from any department within three years. In addition to Mr. Bard, Thomas Adams and Nelson P. Lewis have consented to serve as judges of the competition.



HOLLOWSPUN

LIGHTING STANDARDS

FEW lighting standards are called on to withstand the destructive effect of engine gases. But all of them are subject to the atmospheric attacks which produce the same effect only more slowly. The installation pictured above, at Knoxville, Tenn., is a striking demonstration of the permanence of Hollowspun reinforced concrete lighting standards even under abnormally severe conditions. They have already undergone as much "punishment" as an ordinary installation would get in a good long life. More complete details of this installation are available in "Hollowspun Standard" Number 5. A copy will be sent on request.



MASSEY CONCRETE PRODUCTS CORPORATION
Peoples Gas Building Chicago

Cleveland Charter and P. R. Held Constitutional

CLEVELAND, OHIO.—On March 16, 1923, the Ohio State Supreme Court handed down a decision holding valid the 1921 amendment to the Cleveland city charter, commonly known as the new Cleveland charter.

The attack was based upon alleged irregularities in the submission of the charter, and upon the Hare system of proportional representation incorporated into it. The Court found that it was a regularly submitted amendment notwithstanding that it repealed all but two sections of the original charter, and substituted others. Actually, only about 35 sections were changed as to substance, about 145 being either repeated verbatim with new section numbers or being reenacted with slight editorial revisions.

The Court held that the Ohio constitution does not require the full text of a proposed amendment to be set forth upon the ballot. It held also that the Ohio con-

stitution does not require each section of a proposed amendment to be submitted separately. The proportional representation feature of the new charter had been attacked, the attack being based very largely upon the old Ohio case of *State ex rel. v. Constantine*. The decision appears to destroy the force which that case has had as an adverse precedent. The 5th and 6th paragraphs of the syllabus read:

5. The Hare system of proportional representation, providing a system of voting at municipal elections,, is valid under the Home Rule amendment of the Ohio constitution.

6. Under the Home Rule amendment to the Ohio constitution, the rule that each elector is entitled to vote for every officer whose place is to be filled, is no longer law in this state as regards elections held under the Home Rule city charters.

EMMETT L. BENNETT,
The Civic League of Cleveland.

Playground Progress in 1922

THE Year Book Number (March, 1923) of *The Playground* contains encouraging testimony to the continued growth of the public recreation movement throughout the United States. Reports of expenditures in the maintenance of playgrounds and recreation centers show a substantial increase for 1922. Four hundred and seventy-two cities expended a total of \$9,317,048.79, a gain of nearly half a million over 1921.

To secure adequate leadership has always been the chief objective of the recreation movement. The cities reporting recreation work under paid leadership were 505 in number, the playgrounds and recreation centers in these cities totalled 4,601, and the trained workers numbered 10,967. There were 2,026 workers employed the year round—an increase of 30 per cent over 1921.

Of the 505 cities sending complete reports to the Playground and Recreation Association

of America, the sources of support were:

Municipal funds	238
Private funds	140
Municipal and private funds	118
County funds	7
State, municipal and private funds	2

Increasingly important features of the municipal recreation systems are public swimming pools, baths and bathing beaches. Reports for the past year show the following:

	Cities Reporting	Total
Swimming pools	180	465
Public baths	101	398
Bathing beaches	127	223

One hundred and eleven cities report 286 community buildings used exclusively for recreation purposes. Fifty-two cities state the value of their community buildings, the total being \$8,595,548.

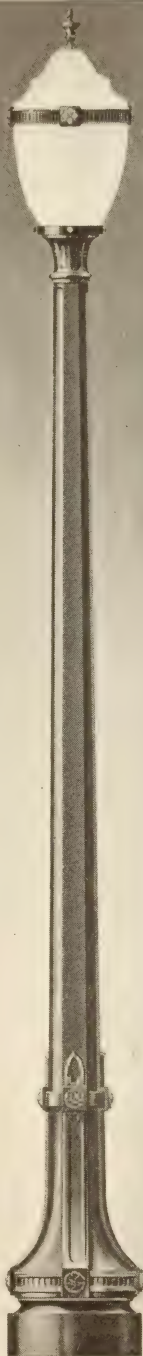
Unsightly Political Posters Eliminated in Municipal Campaign

A MOVEMENT inaugurated by the Municipal Art Committee of the City Club of Chicago some weeks ago, and augmented by the active cooperation of thirteen other associations, against political bill-posting by candidates for public office, met with real success in the recent municipal election in that city.

There was an almost total absence of signs and posters on the fences, trolley and telephone poles and street lamps. The contrast in that regard between this spring election and

the state election last fall is proof of the power of public opinion in such matters.

The following organizations cooperated in this movement: the Rotary Club, Kiwanis Club, Chicago Woman's Club, Woman's City Club, Illinois League of Women Voters, Union League Club, Hamilton Club, Church Federation, Chicago Real Estate Board, Cook County Real Estate Board, All Chicago Council, Association of Commerce, and the Federation of Women's Clubs.



King's
French Design

LANSING, MICH.

Selected This
Beautiful French Design
KING
ORNAMENTAL STANDARD
with General Electric Novalux unit

Because it has

Beauty of Design

Quality of Workmanship

*Efficiency of Illumination and
Permanency of Materials*

Realizing that an artistic appearance, as well as efficient lighting, is involved in modern street illumination—the city of Lansing chose this French design to beautify their streets.

King Standards were chosen, as they were anxious to insure ornamental standards with finish and perfect detail. Alabaster rippled glassware was specified as it alone could produce the live, sparkling effect and high efficiency of illumination necessary.

The reputation of King Standards for performance and the ability of cast iron to resist shock, rust, frost and other forms of deterioration was another reason that affected their choice of King Standards.

A King Street Lighting Specialist will be glad to give you the benefit of his knowledge and personal attention in the development of your contemplated street lighting proposition.

A newly printed street lighting catalog of King installations will interest you, as it pictures the methods and standards used by other cities. We will gladly mail a copy upon request.

King Manufacturing Co.
~ Chicago ~

230 South Clark Street

Municipal and Civic Publications

Prices do not include postage unless so stated

The Engineering of Excavation.—By George B. Massey, Vice-President, Randolph Perkins Company. John Wiley & Sons, Inc., New York. 1923. VI + 376 pp. \$6.00.

A practical book on excavating problems and the application of machinery to them. A large portion of the text consists of original notes by the author, of information obtained first-hand in the field, and of up-to-date information on present-day excavating methods and machinery. This book is of distinct value to the contractor or government official in facilitating the choice of excavating machinery, as it is always possible by analyzing an excavation problem to ascertain what type and size of machine will do the work better and more cheaply than any other. The book is replete with figures, folding plates and tables, giving reliable information with regard to sizes and capacities of steam shovels and buckets, records of work done, the blasting of ditches, quantity and pressure of water for hydraulic excavating, cubic yards excavated per hour by hydraulic dredges, rate of stripping with various machines, data on large revolving shovels, standard shovels, small revolving shovels, dragline excavators, power excavators, dry land dredges, trench-digging machines, buckets, industrial locomotives, drilling and blasting, scows and barges, boilers, fuel, electric drive and wire rope, and the application of machinery to work.

Our Vanishing Forests.—By Arthur Newton Pack, Associate Editor "Nature Magazine." The Macmillan Company, New York. 1923. XVI + 189 pp. Illustrated. \$2.00.

For the average citizen, on whom the solution of the problem indicated by the title of the book depends. Written in popular style, and showing the enormous service rendered by our forests, and the impending catastrophe of their destruction. It emphasizes the principle of "a tree for a tree." The chapter on Town Forests illuminates a wise policy which is being adopted by some far-sighted municipalities.

County and Township Government in the United States.—By Kirk H. Porter, Ph.D., Assistant Professor of Political Science, State University of Iowa. The Macmillan Company, New York. 1922. XIII + 362 pp. \$2.25.

Light on the mysteries of county government is welcome; constructive suggestions for its reform are most desirable. This volume gives both, and does its work clearly and in a way to command interest and attention. Both for the general reader and for the classroom student, it is of value in analyzing a somewhat neglected and quite confusing subject.

Health for School Children.—U. S. Bureau of Education. 1923. 75 pp. Single copy, 10 cents; additional copies, 7 cents each.

Prepared by some of the best-known individual child health authorities in the country, as well as by representatives from 16 national organizations and government bureaus, this report discusses the fundamental principles of health education; the subject matter and methods that should be used; the physical training activities that should be included in the school health program; the details of health supervision for teachers and children; the preparation of classroom teachers for health training and instruction; the hygienic arrangement and management of the school program; essentials for healthful school buildings; and the mental health of normal children. It advocates centralization under a Director of School Health Work, thoroughly and broadly trained.

The Middle of the Road.—By Philip Gibbs. George H. Doran Company, New York. 1923. 428 pp. \$2.00.

A story of the Europe of the 1920's, written with the author's usual skill.

Stickfuls—Compositions of a Newspaper Minion.—By Irvin S. Cobb. George H. Doran Company, New York. 1923. 355 pp.

Illuminating reminiscences of the author's experiences in getting and preparing news for publication.

Insecticides and Fungicides—Spraying and Dusting Equipment.—By O. G. Anderson, Professor of Horticulture, Purdue University, and F. C. Roth, Instructor in Horticulture, Purdue University. John Wiley & Sons, Inc., New York. 1923. XVI + 349 pp. Views and diagrams. \$3.00 postpaid.

A laboratory manual with supplementary text material. The subject is treated from the standpoint of those who must use the materials and appliances described. Designed not only for college students, but for growers and extension workers, and for use in vocational schools. The portion that deals with appliances and their efficient operation is of special interest to park superintendents, nurserymen and county agents, and to manufacturers of spraying and dusting materials and equipment. Presented in simple form, with few technical terms.

Report on Refuse Collection and Disposal for the City of Boston, Mass.—By George A. Johnson, Consulting Engineer, 150 Nassau Street, New York City.

Thirty-six typewritten pages and appendix of 214 typewritten pages. This report completely covers the field of garbage, ash and refuse collection and disposal for Boston, reviewing all earlier reports on this subject and going into detail as to the Coleman contract, showing its bad features both for the contractor and for the city. It shows the fallacy of separate collection and specifically recommends combined collection and incineration for the city. The appendix includes many valuable data on mechanical analyses and collection costs.

Better Homes in America.—Better Homes in America Advisory Council, National Headquarters and Bureau of Information. "The Delineator," 223 Spring Street, New York, N. Y. 1923. 64 pp. Illustrated.

A Plan Book, for Demonstration Week, June 4-10, 1923, prepared for the guidance of local committees in conducting Better Homes demonstrations in line with the national movement emphasizing the importance of the home. Giving an account of the 1922 campaign, and detailed instructions for local committee work. The valuable information about home building and owning includes an article by John M. Gries, Chief of the Division of Building and Housing, Department of Commerce, on "Choosing the Site for Your Home," one on "What to Do with the Outside of the Better Home," by Robert Lemmon, and one on "Buildings and Grounds," by John Ihlder, Manager, Civic Development Department, United States Chamber of Commerce.

The Neighborhood in Nation-Building: The Running Comment of Thirty Years at the South End House.—By Robert A. Woods. Houghton Mifflin Company, Boston. 1923. VIII + 348 pp. \$3.00.

Separate papers prepared under various circumstances, which yet trace the process of social reconstruction from the neighborhood to the city, the state, and the nation. Based on the personal experience of the author since 1891, this study of local community life has authoritative value in developing principles of wide application. Settlements are compared with other types of local centers, and the great possibilities of the future are set forth.

Citizenship: A Practical Textbook in Community Civics.—By Ella Cannon Levis, M. A., Associate Principal and Instructor in Civics in the Jacobi School, New York City. Harcourt, Brace and Company, New York. 1923. XXII + 470 pp. Many illustrations. \$1.60.

This book has grown out of the author's experience as a teacher and has been put to practical test by her in classroom work, as evidenced in the arrangement of the material with lesson plans, topics for reports and debates, questions and lists of supplementary reading. Primary emphasis is laid upon the functions of local government, and these are classified under welfare, safety, utilities, improvements, education, finance, and governmental organization. An excellent tool in building citizenship.



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Town Studies.—By Harold D. Meyer, Associate Professor of Sociology in the University of North Carolina. Bureau of Public Discussion, University Extension Division, University of North Carolina, Chapel Hill, N. C. Extension Bulletin Vol II, No. 4. October 16, 1922. 56 pp. 50 cents postpaid.

A program for women's clubs, leagues of women voters and parent-teacher associations that also offers suggestions for chambers of commerce and other civic bodies. Presenting a consistent point of view from which studies may be made and benefits derived.

The Relation of Landscape Architecture to the Public Schools.—By Charles E. Greening, consulting architect, The Greening Landscape Company. Published by The Greening Nursery Company, Monroe, Mich. 1922. 30 quarto pp. Views and diagrams. \$2.00.

An address before the National Convention of School Officials at Detroit, Mich., June, 1921, presenting the important factors in school landscape development and giving a number of distinctive views and plans of work done along this line.

Statistical Sources for Demographic Studies of Greater New York, 1920.—Published by the New York City 1920 Census Committee, Inc., Room 258, 200 Fifth Avenue, New York, N. Y. Edited by Walter Laidlaw, Executive Secretary. XVIII + 820 quarto pp. A presentation, on the basis of neighborhood populations, of the facts of the 1920 Census relative to Greater New York. Information on 1,665 tracts of over 1,000 population, with 740 items for each district. These items include such facts as growth, movement, race, sex, age, nativity, mother-tongue, literacy and disease- and death-rates, and are presented by a mapping system and in tabular form, with illuminating, human interest explanations by the Editor. Reproductions of the original statistical sheets containing the sources for these demographic studies make the greater part of the volume. The neighborhood knowledge herewith given is a basis for "effective social engineering for the city that should be." Price \$50. (Apply to publishers.)

The Face of the Earth As Seen from the Air.—By Willis T. Lee, U. S. Geological Survey. American Geographical Society, New York. 1922. XII + 110 pp. Many illustrations. \$4.00.

Showing the possibilities of using the airplane and airplane photography as a means of securing information in various fields. Containing many very fine examples of aerial photography.

The Value of Zoning to Business.—By Arthur C. Comey. A 2-page reprint from "Current Affairs" of February 12, 1923. Presenting arguments for the need of zoning in Boston, illustrated by instances of its benefits in other cities. (Apply to "Current Affairs," Boston Chamber of Commerce, Boston, Mass.)

Health Scoring of School Children.—By Taliaferro Clark, Surgeon, and Edith B. Lowry, Acting Assistant Surgeon, United States Public Health Service. A practicable plan of "follow-up" in school health work by the child. 12 pp. in "Public Health Reports" of February 16, 1923. Price 5 cents. (Apply to the Government Printing Office, Washington, D. C.)

Community Extension.—Prepared by Joseph Ernest McAfee, Community Counselor, Extension Division, Department of Public Information and Welfare, University of Oklahoma. 94 pp. "Suggestive to members of newly formed community councils, or other civic organizations aiming at comprehending under one program the multifarious and now too often unrelated activities upon whose harmony and efficiency the health and prosperity of the community depend." (Apply to the University of Oklahoma, University Hall, Norman, Okla.,)

Specifications for Petroleum Products and Methods of Testing.—Federal Specifications Board Standard Specification Number 2, revised October 31, 1922. These specifications were officially adopted on February 3, 1922, for the use of departments and independent establishments of the Government in the purchase of materials covered by them. Technical Paper 323 of the Bureau of Mines. Price 10 cents. (Apply to the Government Printing Office, Washington, D. C.)

Amsterdam—Old and New.—By Clarence S. Stein. Housing Reprints—I. A comparison of the methods adopted by Amsterdam and by New York City to meet the housing dilemma. 20 quarto pp. Illustrated. Published for the Committee on Community Planning of

the American Institute of Architects by the Journal of the American Institute of Architects, 313 East 23rd Street, New York, N. Y. (Apply to Institute.)

The Results of Physical Tests of Road-Building from 1916 to 1921 Inclusive.—Bulletin No. 1132 of the United States Department of Agriculture. March 21, 1923. 55 pp. Tables, with brief comment. Price 10 cents. (Apply to the Government Printing Office, Washington, D. C.)

The Menace of Morphine, Heroin and Cocaine.—By Montaville Flowers and H. R. Bonner. Published by the International Narcotic Education Association, Pasadena, Calif. 47 pp. The purpose of this pamphlet is to begin, in and out of schools and colleges, the systematic education of youth against the use of narcotics. Price per copy, 25 cents; 5 for \$1; 100 for \$18. All receipts will be used to print new editions. Any number of copies mailed direct to addresses furnished. (Apply to publishers.)

The Library and the Municipal Official.—By Sophia Hall. Information Report No. 29 of the Municipal Information Bureau of the University Extension Division of the University of Wisconsin. February, 1923. 11 mimeographed pp. Showing what material should be in a public library for the special service of city officials, where and how to obtain it, and how to make it of use. (Apply to the Bureau, at Madison, Wis.)

Plan of New York and Its Environs.—Report of Progress, May, 1922, February, 1923. 67 pp. Abstract of reports in the four main fields of inquiry—physical, economic and industrial, social, and legal—relative to a comprehensive regional plan of New York and its environs. The reports are the work of recognized authorities in the respective fields, and make clear the complexity of the problems and the need of region-wide cooperation. (Apply to Plan of New York and Its Environs, 130 East 22nd Street, New York, N. Y.)

Survey of City and Regional Planning in the United States, 1922, with a List of Plan Reports, 1921-1922.—By Theodora Kimball, Librarian, School of Landscape Architecture, Harvard University; Hon. Librarian, American City Planning Institute. Reprinted from "Landscape Architecture," January, 1923. 20 pp. Under the heads: Official Support; Public Understanding; Progress in Construction; Legislation; Technical Advance; Metropolitan, County and Regional Planning; Zoning; Comprehensive Plan Reports; Major Street Plans; Civic Centers; Land Subdivision and New Towns; Port Development, Railroad Terminals, and Rapid Transit; Parks and Recreation; Future Plans. (Apply to the Library of the School of Landscape Architecture, Harvard University, Cambridge, Mass.)

The Other Side of the Budget.—By Lent D. Upson, Director, Detroit Bureau of Governmental Research. 4 pp. Reprinted from "National Municipal Review," March, 1923. Showing how to make the city budget intelligible by putting it in terms of actual work done or proposed. (Apply to the "National Municipal Review," 261 Broadway, New York, N. Y.)

The Tax Rates of Illinois Cities in 1921.—Published by the University of Illinois, Urbana, Ill., as Bulletin No. 3 of the Bureau of Business Research. April 30, 1923. 16 pp. Map, diagram, tables. Comparative figures. (Apply to the publishers.)

Official Directory of the City of New York, 1923.—Prepared under the direction of Peter J. Brady, Supervisor of the City Record. Compiled by William Viertel, Editor of the "City Record." Pocket size. 258 pp. Comprehensive, well-indexed information, brought up to date. Addresses and telephone numbers of officials, departments and bureaus in the city, and names and addresses of state and federal officials. An easily used compendium. Price, paper-bound, 15 cents; leather-bound, 30 cents. (Apply to the Board of City Record, Room 1812, Municipal Building, New York, N. Y.)

City Plan for East Orange, Essex County, New Jersey.—Prepared by the City Plan Commission. 1922. 80 quarto pp. Maps, plans, tables. A thorough study of every phase of the present physical conditions and the future development of this city, showing what has been accomplished since 1916 in systematic city planning for the community. The details of this progress are given in the appendix of 54 pp. (Apply to the consulting engineers, the Technical Advisory Corporation, 132 Nassau Street, New York, N. Y.)

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Metropolitan Planning and Development in Boston and Its Environs.—Prepared by the Committee on Municipal and Metropolitan Affairs and the Committee on Public Utilities of the Boston Chamber of Commerce. 32 pp. Diagrams. Showing reasons why, and recommending that, a permanent Metropolitan Planning Board should be formed to study the traffic and transportation problems of Boston and to lay out and construct roads, bridges, etc., of a metropolitan character, to aid in the handling of traffic in the district. (Apply to Thomas J. Kenny, Chairman of the Committee.)

Report of the Survey Committee Appointed by the Montclair (N. J.) Home and School Council.—Part I, Teachers' Salaries; December 1, 1922, 24 pp., diagrams; recommending a revision of the salary scale as conditions require. Part II, Administration and Costs; February 26, 1923; 51 pp., tables; giving data that are stated to prove that a reduction of the school budget would mean the lowering of the high educational standards and the varied program heretofore maintained. (Apply to Dr. W. E. Mosher, Bureau of Municipal Research, 261 Broadway, New York, N. Y.)

Business Cycles and Unemployment.—Report and Recommendations of a Committee of the President's Conference on Unemployment, with a foreword by Herbert Hoover. 1923. 30 pp. Giving ten recommendations for controlling the extreme fluctuations of the business cycle by the direct prevention of expansion or inflation and by the prevention of unemployment. Price 5 cents. (Apply to the Superintendent of Documents, Government Printing Office, Washington, D. C.)

Town-Planning in Patiala State and City.—A report to H. H. the Maharaja of Patiala, by Professor Patrick Geddes, member of Town Planning Institute. 1922. Printed in Lucknow, India. 120 large pp. Illustrated. A comprehensive and detailed study of the various features of this section—streets, parks, gardens, schools and other public buildings, industries, etc., and their possible future development. (Apply to the author as head of the Department of Civics and Sociology, University of Bombay, Bombay, India.)

Manual of Probation Work.—By Edwin J. Cooley, Chief Probation Officer, Magistrates' Courts of the City of New York. 1922. 97 pp. Containing the rules and regulations for the government of the Probation Service, and the laws relating to probation, statements of the standards for effective probation work and socialized procedure in family courts, a standard record system, and an outline of the probation organization. (Apply to William F. Delaney, Chief Clerk of the Board of City Magistrates.)

Hygeia.—A journal of individual and community health. Volume 1, Number 1. April, 1923. Published by the American Medical Association, 535 North Dearborn Street, Chicago, Ill. 76 quarto pp. Illustrated. This first number contains articles of popular interest on personal and public health, and makes a direct appeal to the common sense and the intelligence of the people. (Address the publishers.)

Burned Behind Bars.—Bulletin No. E11 of the National Fire Protection Association, 40 Central Street, Boston, Mass. 4 pp. Illustrated. Describing the fire in the Manhattan State Hospital for the Insane, on Ward's Island, New York Harbor, on February 18, 1923, and pleading for fire protection in such public institutions. \$1.50 per 100; discount for thousands. (Apply to publishers.)

Widows' Pensions.—A study of 53 fatherless families in Dallas County, Texas, who are aided by the County Commissioners Court; including the Texas Widows' Pension Law and its method of administration. Compiled and published by the Civic Federation of Dallas, 415-17 Mercantile Bank Building, Dallas, Texas. Gaynell Hawkins, Research Secretary. Field work by students of sociology, Southern Methodist University, directed by Professor Comer Woodward. 20 pp. (Apply to publishers.)

Forty-seventh Annual Report of the President, Treasurer and Attorney of the Legal Aid Society of New York City for the Year 1922.—A most interesting report of the work of this organization in rendering legal aid gratuitously to those who need it and are unable to procure it elsewhere, and in promoting measures for their protection. 98 pp. (Apply to Leonard McGee, Attorney-in-Chief, 239 Broadway, New York, N. Y.)

What People Say About School Consolidation; together with Questions We Are Asked Relating to School Consolidations.—Compiled by the Department of School Consolidation, Kansas State Normal School. 50 pp. Views and tables. Letters (1921 and 1922) from patrons of consolidated schools in Kansas. A straightforward, unpruned expression of opinion on the subject. The answers to the "Questions We Are Asked" illuminate all the points of discussion. (Apply to M. L. Smith, Director, Department of School Consolidation, Kansas State Normal School, Emporia, Kans.)

Community Planning.—By Rolland S. Wallis, Municipal Engineer, Engineering Extension Department, Iowa State College. A paper presented before the Iowa Secretarial Association at its annual winter school, held at Ames in 1922. Special Bulletin No. 12 of the Iowa Town Planning Association. February, 1923. 8 type-written pp. Explaining what community planning is, the need of it, its elements, its procedure; and summarizing the problems involved. (Apply to the Iowa Town Planning Association, Ames, Iowa.)

Child Labor in the United States.—Ten questions answered by the Children's Bureau of the U. S. Department of Labor. 31 pp. Diagrams and Tables. A definite statement of facts. (Apply to the Children's Bureau, Washington, D. C.)

Law Enforcement in the Control of Tuberculosis.—By Edgar A. Jonas, President, Board of Directors, Municipal Tuberculosis Sanitarium and First Assistant State's Attorney, Chicago, Ill. 7 pp in the Bulletin, March, 1923, of the City of Chicago Municipal Tuberculosis Sanitarium. Reprinted from the "American Journal of Public Health," February, 1923. Read before the Public Health Administration Section of the American Public Health Association, at Cleveland, October 18, 1922. (Apply to the Sanitarium.)

Rules and Regulations for the Control of Tuberculosis.—By the Illinois Department of Public Health. Rules revised and in force January 1, 1923. 10 pp. (Apply to Isaac D. Rawlings, Director of the State Department of Public Health, Springfield, Ill.)

What You Should Know About Tuberculosis.—Useful facts for the tuberculous and those living with them. Reprint of pamphlet prepared by the Canadian Association for the Prevention of Tuberculosis. Issued by the Department of Health, Canada. 1922. 16 pp. (Apply to Dr. Robert E. Wodehouse, Secretary, The Canadian Association for the Prevention of Tuberculosis, Ottawa, Ontario.)

Souvenir Program, Minneapolis Music Week, January 10-17, 1923.—34 pp. (Apply to Elsa C. Henke, Secretary, Civic Music League, 711 Lowry Avenue, N. E., Minneapolis, Minn.)

Transportation of Milk in Metal Tanks.—By Russell S. Smith, Market Milk Specialist, Dairy Division, U. S. Department of Agriculture, Washington, D. C. Reprinted from the Eleventh Annual Report of the International Association of Dairy and Milk Inspectors. 16 pp. Prepared from the writer's observation of the actual operation of metal transportation tanks mounted on railway cars, on electric cars and on motor trucks, and from the experience of transportation tank owners, without comparing the relative merits or demerits of different types of equipment. (Apply to the Department of Agriculture, Washington, D. C.)

Baltimore, Md.—Twenty-eighth Annual Report of the Free Public Bath Commission. For the year 1922. (Apply to Eugene Levering, Chairman.)

Manchester, N. H.—Second Annual Report of the Department of Highways. For the year 1922. (Apply to E. R. Conant, Surveyor.)

Oak Park, Ill.—Annual Report of the Playground Board for the year 1922. (Apply to Dudley C. Meyers, Secretary.)

Oak Park, Ill.—Twenty-first Annual Report of the Department of Public Works. For the year 1922. (Apply to Charles E. White, Jr., Commissioner.)

Palo Alto, Calif.—Annual Report of the Health Department for the year 1922. (Apply to Louis Olsen, Health Officer.)

Springfield, Mass.—Forty-ninth Annual Report of the Board of Water Commissioners. For the year 1922. (Apply to Howard M. King, Superintendent, Municipal Water Works.)



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A New Low-Cost Motor Pick-up Street Sweeper

The first announcement of 1923 to officials interested in cleaner streets at a lower cost comes from Foamite-Childs Corporation, Utica, N. Y., well known in the fire-fighting field. This company has announced a new pick-up sweeper with a number of points in which it claims superiority over other street-cleaning machines of the pick-up type.

The new sweeper has an automatic gutter broom that works in and out with the curb line, independent of the driver. The large rear broom is so designed that wear automatically shortens the distance between the broom and the conveyor. The broom itself stops when the shear pins break, making it impossible to foul the conveyor. The large carrying capacity of the conveyor makes it practically impossible to choke or clog it with heavy sweepings. The conveyor, which has a removable bottom that is easily replaced, feeds into a straight-side hopper without bridges or shelves to hold back the sweepings when the dump is operated. There are only six drive chains in the entire machine, including the conveyor, and all mechanical parts are accessible. Another feature is that the sweeper will operate while the machine stands still. Its normal working speed is 9 miles per hour.

The new "Childs" sweeper is of the 4-wheel type with a Reo Speedwagon power-plant, right-hand drive and self-starter. It is a strictly one-man machine, with all the levers

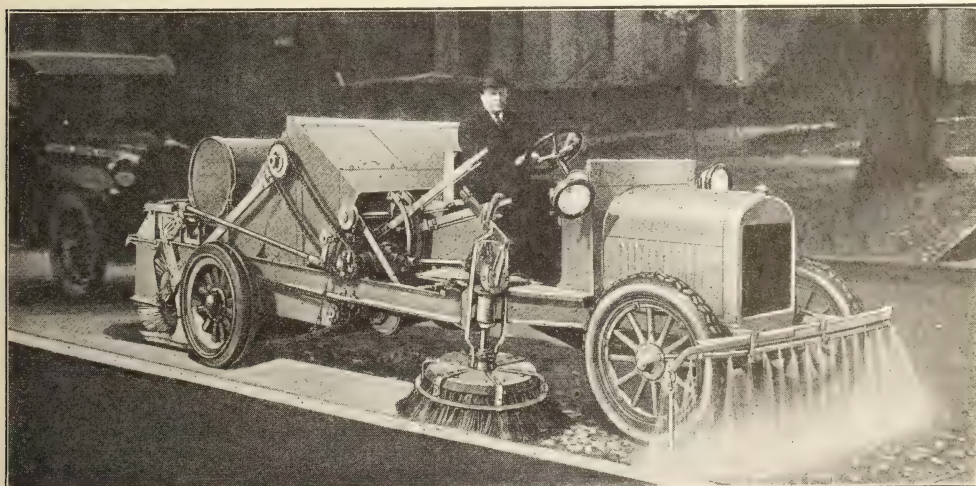
so arranged that the operator has complete and convenient control without leaving his seat. The rear axle of the Speedwagon is moved forward and converted into a jack-shaft. The service and emergency brakes mounted on the rear axle are still used as such. The large rear broom is built up on a grooved wooden core, with end castings to protect the fiber. The rear broom is filled either with steel or split bamboo, and one extra broom is furnished with each machine. The hopper or dirt receptacle has a carrying capacity of 50 cubic feet. The gutter broom has a steel fiber filling built 42 inches in diameter in six segments that are easily and quickly changed when the broom is worn out. It is operated by bevel-cut steel gears running in an oil bath on annular contact ball bearings.

The water-sprinkling system in front of the machine consists of a 150-gallon galvanized iron tank, with brass strainers at the intake and outlet, from which water runs by gravity to a rotary gear Deming brass pump that forces the water to the brass nozzles mounted under the bumper in front. The water spray is controlled by the driver. Unused water is returned to the tank by a by-pass.

Childs sweepers have already been purchased by the cities of Massena and Elmira, N. Y.

The Venturi Meter in the Filtration Plant

The accompanying diagrammatic layout of a typical rapid sand filtration plant assumes the source of raw water to be a river or lake from



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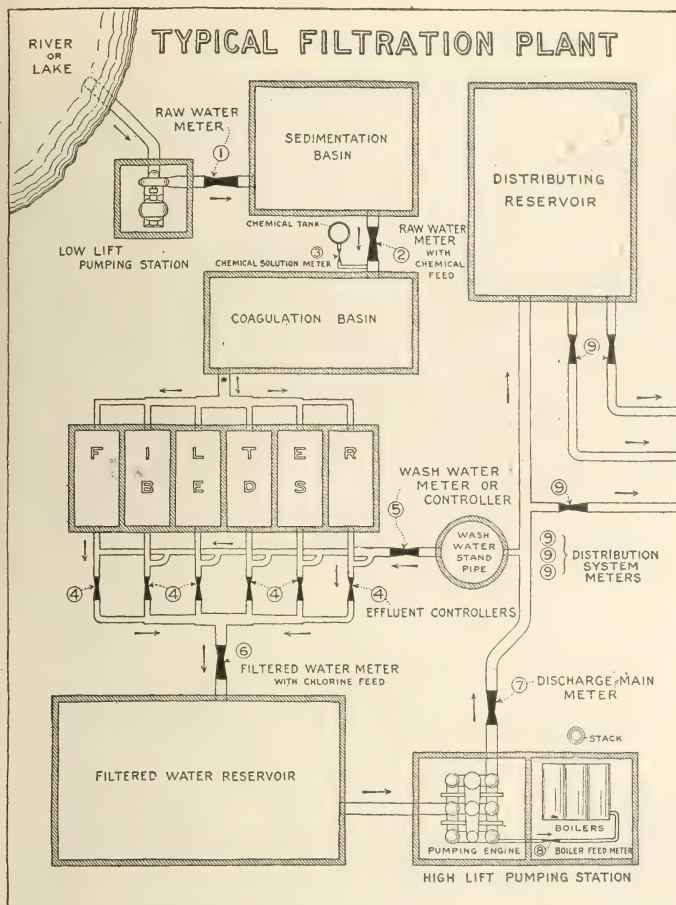
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A DIAGRAMMATIC REPRESENTATION OF A TYPICAL FILTER PLANT, SHOWING LOCATION OF VENTURI METERS

which the supply is pumped by the low-pressure service pump, or flows by gravity to a sedimentation basin where the turbid water is partially clarified by the gradual settling of suspended matter. The Venturi meter (1) on the main supply line gives an accurate accounting of the total raw-water supply and all variations in the rate of supply. It also serves as a constant check on pump performance, giving immediate warning of broken, roughened or clogged impeller vanes, worn valves, leaky plungers or other defects in equipment or operation. Occasionally certain chemicals, such as lime or iron, are added to the water before it reaches this basin, to hasten and increase precipitation.

From the sedimentation basin the water passes through the second meter (2) to the coagulation basin. During its passage the water is chemically dosed with alum or iron, milk of lime, soda-ash, etc., for promoting filtration by the formation of floc, which is caught by the filter-bed sand. A meter at this point reveals the hourly rate of flow to the coagulation basin, and by comparing its readings with the raw-

water meter, shows the loss of water by leakage or evaporation.

From the meter readings at 1 and 2, the application of the chemicals can be properly maintained through manually regulated orifice tanks or by an automatic chemical controller operated by the meter itself.

In larger filtration plants, it is often advisable to place a meter on each feed line (3). The importance of keeping the supply of chemicals, whether manually or automatically controlled, under accurate regulation to insure proper treatment and to avoid waste, is universally recognized. The daily information furnished by the Venturi meters thus become and records of the value of great value in at once revealing improper conditions of operation.

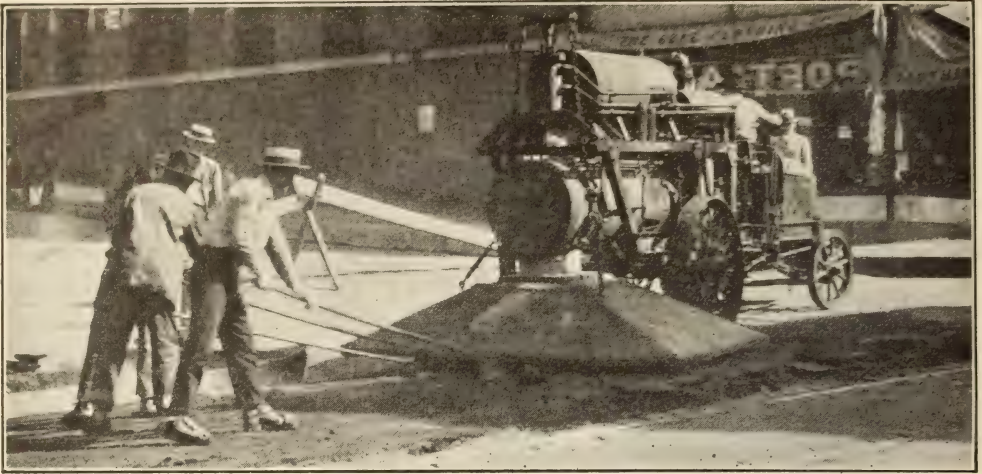
After coagulation, the water is admitted to the filters. In slow sand filtration plants, manual control of the main valve is practical. Hence a plain Venturi tube set in the effluent line from each filter and connected to a suitable loss-of-head and rate-of-flow gage forms a combination for accurate guidance in proper filter operation.

The advent of the rapid sand filtration plant brought with it, however, an immediate demand for automatic rate control of the filter effluent. In this case the Venturi effluent controller may replace the simple meter in the effluent line for each filter (4). As the sand-bed becomes clogged, the loss of head increases and the control valve gradually enlarges its opening, until finally a wide-open position is reached.

The need of controlling the rate of wash of filters, so as to prevent an unduly high rate, with consequent loss of some of the upper sand layers, is fully recognized. Either a self-contained or a diaphragm type of Venturi controller may be placed directly in the wash line and the rate set on the scale beam, thus insuring safety in washing filters.

From the filter-beds the water is delivered to the clear-water conduit or reservoir. At this point (6) final sterilization may be necessary by the use of liquid chlorine. It is particularly essential that the rate of feed be in close proportion to the rate of filtered water to insure proper bacterial results and to avoid overdose. A Venturi meter is usually used as

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a controlling device for connection to the automatic chlorinating apparatus.

A high-service pumping-station is usually required to send the filtered water to a distribution reservoir, from which it flows by gravity to the city. In some localities the water is pumped directly into outgoing mains which have a common connection to a stand-pipe which "floats" on the system. One or more Venturis are needed on the discharge line (7) from the high-service pump, which may be either of the reciprocating or of the centrifugal type. Here the meter accounts for the daily output of filtered water, which can be compared with the daily input of raw water, disclosing the gradual, but none the less serious, increase of slip on the pumps, as the pump valves become worn or broken, or fail to seat properly.

A complete power-plant in connection with large filtration plants is often warranted. The power-plant may prove a source of expense rather than an economy, however, if proper instruments are not used to guide operation. It is of special importance that the performance of the boilers be constantly watched and a meter placed on the boiler-feed line which not only gives the total pounds of water evaporated but immediately points out inefficiency in feed water control, and in numerous other ways serves as a thoroughly reliable guide in the work done by each boiler up to a maximum.

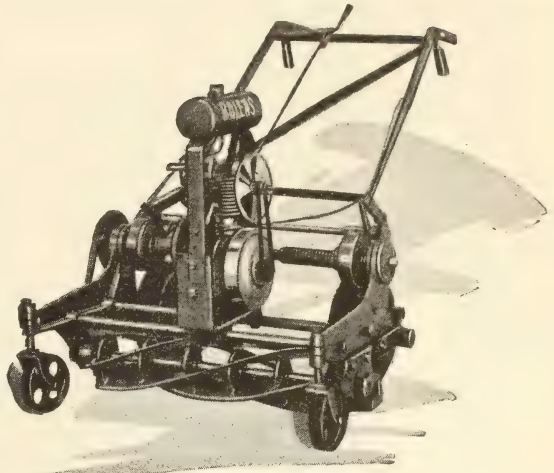
The importance of placing Venturis on all outgoing distribution lines (9) has been emphasized repeatedly, since in no other way can exact knowledge be obtained of the day and night supply and the demand of the various districts, reservoirs and stand-pipes.

The layout of a typical filtration plant is published through the courtesy of Builders Iron Foundry, Providence, R. I.

Convertible Motor Lawn-Mower and Roller

The demand on the part of park superintendents for a power-driven combined lawn-mower and roller which can be used as one or the other or both, has led to the development of the Bolens lawn-mower tractor by the Gilson Manufacturing Company, Port Washington, Wis.

This new mower is a combination of the two types. There is a flexible eight-segment roller at the back, the six inner segments of which can be removed, leaving the two outer segments as driving wheels, thus converting the machine into a simple motor mower. To remove these segments is only a matter of a few minutes through the loosening of four cap-screws. The value of rolling is at a maximum in the spring, when the soil is more or less puffed and irregular because of frost action. As soon as the dry weather sets in, a continuous rolling of the lawn becomes harmful rather than beneficial, and it is at that time that the wheel



A COMBINED MOTOR ROLLER AND MOWER
WITH SEGMENTS OF ROLLER REMOVED FOR
MIDSUMMER WORK

type of power lawn-mower is more desirable.

Another special feature of the Bolens mower is a detachable cutting unit, the cutting unit and cutter bar being an assembly that can be quickly removed by loosening four cap-screws. The machine can be turned by power by means of right- and left-hand clutch drives. There is a safety slip clutch on the reel drive to prevent damage from obstacles getting between the reel and the cutter bar. There is a center clutch by means of which the entire outfit, including the reel, can be instantly stopped. With this clutch engaged and the driving clutch released, the machine stands still, but the reel is under power.

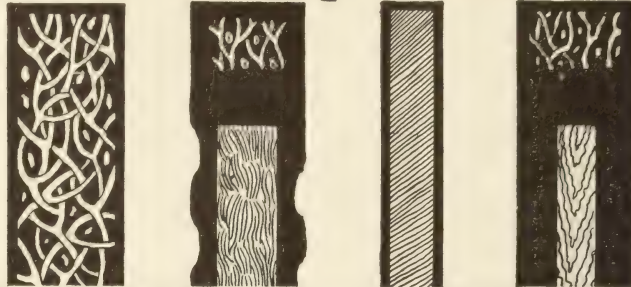
A New Type of Pump Valve

An entirely new form of pump valve has been brought out by the Worthington Pump & Machinery Corporation, New York City. This valve, when applied to service conditions that have been difficult for the older standard valves by causing cutting and leakage, is claimed to eliminate both these troubles and therefore to increase the average pump efficiency, decrease the cost of pumping, and maintain the capacity of the pump at its maximum.

After many years of building and operating pumps, Worthington engineers have found that the principal cause of leakage is traceable to the excessive wear on the rubber, which, while negligible in some cases, is often quite bad. To overcome rapid and costly wearing, cutting and cracking action, the new Worthington "Seal" valve is offered for use when the conditions are too hard for the ordinary form of valve now in standard use.

The new valve is ingenious and simple. There are no screws, no bolts, no rubber rings, no nuts, no bushings, and no rotating elements. The principal new feature that adapts this valve for hard service is the so-called "bottom plate,"

Servicised Expansion Joints



MONITORS OF THE ROAD

Old principles of expansion joint provide fillers of solid asphaltic content or impregnated fibre and asphalt in an elastic mass. ¶ The fundamental purpose of the filler is to re-occupy the space left by two contracting slabs. ¶ Solid asphaltic or impregnated fibrous materials contract, concrete slabs likewise contract on cooling. ¶ Three contracting bodies cannot occupy the same space as when expanded. Servicised Joints expand when the concrete slabs contract. ¶ This is the key to a permanent waterproof joint; a correct answer to the problem of expansion between two contracting bodies. Unimpregnated cellular fibrous matter in Servicised Joints brings about this re-expansion after compression is relieved.

Trapped Under Compression: The print to the right is an example of oozing under compression. Due to the hard asphalt surfacing over the concrete base, the traffic could not carry the surplus away because it was locked in between the asphalt surfacing and base. The force was great enough, however, to form bulges in the hard asphalt surface.

Write Us About Your
Expansion Joint
Problems



A Bituminous and Impregnated Fibre or Elastic Mass: No better proof of indiscriminate oozing. No better illustration of the need of expansion joint of the proper kind. The action in this instance resembles that of paste in a tube being squeezed with one side open. Action of this kind causes tremendous waste, without resulting in good. Servicised Joints will prevent this.

Servicised Products Co.
First National Bank Bldg.
CHICAGO



TYPE B
75% Bitumen
25% Cellular Fibre



TYPE D
Self-Expanding
Non-Raising

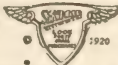


TYPE C
Felt Center-Coated
Sides-Sidewalk Joint



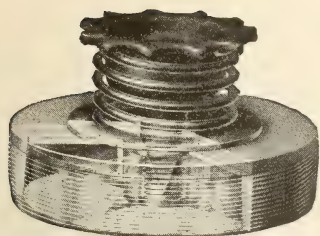
TYPE AA
3/16 Veneer Core

Four Types of Servicised Expansion Joints



in Which the Oozing Tendency Is Controlled

Servicise the Crevice and Save the Road



PHANTOM VIEW OF SEAL VALVE

which is, in effect, a middle seat for the rubber valve proper. When the valve is closed, this middle seat carries the entire load and prevents the rubber seal from cutting on the seats or ribs. The bottom plate moves up and down with the rubber, and so not only acts as a middle seat, but is movable with the rubber, and helps to keep the rubber valve in shape, even when open. Thus, all mechanical functions requiring strength and wear resistance are cared for by metal parts; the flexible rubber acts only as a seal against leakage.

Removal of Technical Advisory Corporation Offices

The Technical Advisory Corporation has announced the removal of its offices to a larger suite in the Park Row Building, 15 Park Row, New York City. The Technical Advisory Corporation is a cooperative organization of engineers rendering advisory service and specializing in canals, harbors, highways, railways, sewers, tunnels, water-power, power development and operation, special machine design, material handling, fuel, ores, dyestuffs, explosives, research and processes, streets and paving, parks, landscape architecture, waste disposal, building and zoning ordinances, city plans, industrial investigations and reports, analyses of operation and costs, plant layout, management, public utility valuation and rate investigation, steam, gas and electricity, railway and water transportation.

Building a 200,000-Gallon Tank at Three Rivers, Mich.

At Three Rivers, Mich., the Pittsburgh Des Moines Steel Company, Pittsburgh, Pa., erected a 200,000-gallon elevated steel tank for the city. The illustration shows the tank under construction. For hoisting the 92 tons of steel used in the building of this tank, consisting of sheet steel and other fabricated parts, a Novo combination hoist and air compressor was used. The outfit consumed about 12 gallons of gasoline per 9-hour day.

The Novo AF 4-cylinder engine is the power-plant used to run a 90-foot compressor. This amount of air will drive two riveting hammers or a riveter and a calker. The hoist as used on this job held 700 feet of 5/16-inch cable and lifted a 4,000-pound basket pole, 70 feet long, with ease, as well as handling all the steel used in the work.

The tank itself is 110 feet high and has six

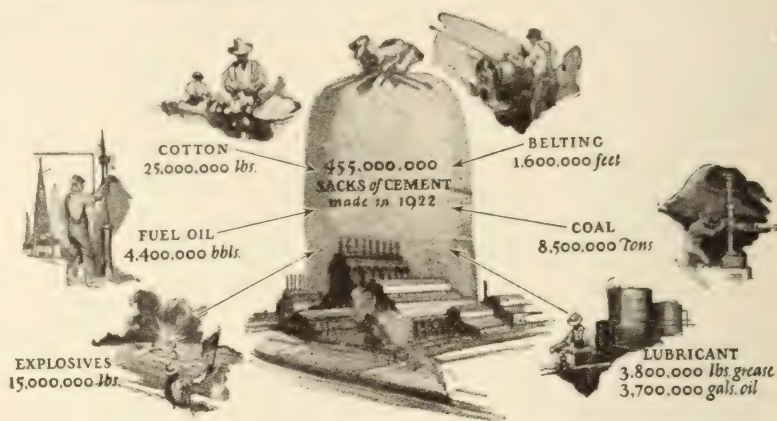


THE NEW THREE RIVERS TANK UNDER CONSTRUCTION

posts, and the base columns are 37 feet, 8 inches long, and weighs $3\frac{1}{2}$ tons each. According to W. H. Petty, in charge of construction on the job at Three Rivers, the Novo hoist and air compressor handled all of the work required of it with ease.

Large Demand for Fire Hydrants

The Waterous Fire Engine Company, St. Paul, Minn., manufacturer of the Waterous improved compression type fire hydrant of the non-jacketed type, has announced that the demand for this hydrant has necessitated putting on a night crew at the factory. This season the Waterous hydrant has been adopted for use in water-works improvements being installed at White Lake, Blunt, Vermillion, and Tulare, S. Dak.; Maurice, Van Horne, Malvern, Carson, Red Oak, Carroll, and Hull, Iowa; Bellevue, and Aurora, Nebr.; Winsted, North Branch, Morristown, Staples, St. Cloud, Springfield, Amboy, Hutchinson, Edgerton, and Alexandria, Minn.; Hillsboro, and Walhalla, N. Dak.; Milton, Wis., Hanover, Ill., and other cities.



Your Business—and Cement

WHO OPERATES a basic industry is less important than how many people benefit by it.

From the cement industry, an extraordinary number benefit.

In making the 455,000,000 sacks turned out last year, the mills used 8,500,000 tons of coal. This meant 8,500 coal miners steadily employed—their families, numbering not less than 25,000, maintained—and along with them tradesmen and other people enough to supply the needs of a town of over 50,000.

That is, of course, saying nothing of the business created for coal operators and transportation lines.

Sacks are a lesser item in the cement industry than coal,

yet 50,000,000 new sacks, representing 50,000 bales—25,000,000 pounds—of cotton, had to be bought last year. Back of this were cotton planters, plantation workers, mill owners, mill operatives and so on—thousands altogether.

And consider these other requirements of the industry last year:

4,400,000 barrels of fuel oil
3,400,000,000 cubic feet of gas
15,000,000 pounds of explosives
32,600,000 pounds of greases and oils
1,600,000 linear feet of belting
4,500,000 firebrick for relining kilns
7,000,000 pounds of paper for bags
570,000 tons of gypsum

In addition the industry bought quantities of heavy grinding and burning machinery, locomotives, cars, rails, electrical and other necessary equipment.

It's interesting, isn't it, how a single industry can spread prosperity?

PORTLAND CEMENT ASSOCIATION

*A National Organization
to Improve and Extend the Uses of Concrete*

Would you like to have a copy of our little brochure, "Fifty Years of Portland Cement in America"? If so, ask for your free copy.

Atlanta	Des Moines	Los Angeles	Parkersburg	San Francisco
Boston	Detroit	Milwaukee	Philadelphia	Seattle
Chicago	Helena	Minneapolis	Pittsburgh	St. Louis
Dallas	Indianapolis	New Orleans	Portland, Oreg.	Vancouver, B.C.
Denver	Kansas City	New York	Salt Lake City	Washington, D.C.



A SPEEDY 6-CYLINDER MOTOR TRUCK WITH DUMP BODY

A Six-Cylinder Speed Truck with Dump-Body Equipment

The use of light, speedy motor trucks in the construction of concrete roads has been a factor in increasing the mileage of roads of this type constructed in any one season. The Avery Company, Peoria, Ill., has recently put out a 6-cylinder truck equipped with a dump body made by the Heil Company, Milwaukee, Wis., especially built for utility work, being adapted to road maintenance, general contracting and construction of all kinds. The hoist on the dump body will lift a 3,000-pound load to a 45-degree dumping angle with 15 turns of the crank by applying 30 pounds pressure to the crank. The hoist can be locked so that only part of the load need be dumped at any one time.

The length of the dump body is 7 feet, by 4 feet wide, and the height of the lower side is 12 inches and of the upper side 8 inches. It has a capacity of 28 cubic feet to the top of the lower side, and a total capacity of 42 cubic feet. The body is tapered, being 3 feet 11½ inches on the front and 4 feet 1½ inches at the rear. It is mounted 9 inches from the sill to the bottom of the body. Twelve-gage steel is used throughout, and the tail-gate is double-acting, with a special adjustable feature.

A Ditcher with a Vertical-Digging Boom

A vertical-digging, side-discharge type trenching machine, mounted on crawler traction with no auxiliary wheels, is a new development in ditching machines which has recently been brought out by the Barber-Greene Co., Aurora, Ill. This radically designed machine, which digs straight down and has a positive-discharge bucket, has been thoroughly tested by real work in the field for more than a year. The machine digs straight down to a depth of 5 feet and a width of either 7½ or 15 inches. The buckets are part of the chain, built to break as they pass over the head sprocket, thus insuring positive discharge of any kind of material.

During the summer of 1922, after many fac-



A FORE-AND-AFT VIEW OF THE NEW VERTICAL-DIGGING TYPE TRENCH EXCAVATOR, SHOWING TRENCH FOR PIPE IN INSET



Garford Low Cost Operation Contributes to Department Economy

In municipal service Garfords provide a sure source of saving for any department using motorized equipment. The Garford shown above is used by the Division of Electricity in Ashtabula, Ohio.

The wide range of the Garford line offers the truck of the right power and capacity for any purpose. Garford Engineers are broadly experienced in designing special equipment for any particular needs.

They are prepared to work with Department Heads, and to make sound, trustworthy recommendations as to what equipment is needed and what will insure the utmost efficiency and economy. This service is free. Ask for consultations with Garford Engineers at any time.

The Garford Motor Truck Company, Lima, Ohio

Manufacturers of Motor Trucks 1 to 7½ Tons

GARFORD

DEPENDABLE TRANSPORTATION

tory tests, the ditcher illustrated was put to work digging trenches for the gas-mains at the new grounds of the Central States Fair and Exposition near Aurora. Here it dug 2 miles of ditch for gas-mains, averaging 600 feet per day through different kinds of soil, such as black loam, gravel, yellow clay and white clay. During this digging the machine encountered construction work on foundations, which necessitated running the gas pipe around the foundations. To do this, the machine turned four successive corners, each at an angle of about 70 degrees, without removing the boom from the trench. During this time the machine was operated by only one man.

The sturdiness of the machine was well demonstrated in that only two minor repairs were necessary and the replacement of occasional breaking pins, with which the machine was provided as a safety measure to protect it when large boulders were encountered. This low repair record of a new machine was possible because it was made up almost entirely of previously tested units. The crawlers on which it was mounted are the same standard crawlers used on the Barber-Greene Model 42 loader, and the Buda engine and Cotta transmission are also the same.

After the machine had finished its work at the Fair Grounds, it was brought to Aurora and used by the Western United Gas and Electric Company to replace a labor gang in extending the gas-mains of this company on Pierce Street. Here one operator replaced a whole digging gang, doing the work of 20 men, and, it is claimed, effecting a saving of about \$75 per day.

New Union Meter Representative in New England

The Union Water Meter Company, Worcester, Mass., has announced that Guy C. Northrop has become associated with its sales department and will devote his attention to the New England territory. Guy Northrop is the son of F. L. Northrop, who represents the A. P. Smith Manufacturing Company, of East Orange, N. J., in New England, and the brother of M. L. Northrop, who is connected with the Boston office of the Warren Foundry & Pipe Company, of Phillipsburg, N. J.

A Root Cutter for Cleaning Sewers

The Victory self-propelling nozzle for sewer cleaning, described in these pages some time ago, is now being made equipped with a root cutter. The Self-Propelling Nozzle Company, Inc., 99 Water Street, New York City, claims that this self-propelling root cutter is an assurance against clogged sewers. The machine is a simple, easily-operated tool which travels from the manhole to the obstructing roots or sticks under its own power, and it is claimed that upon reaching them the revolving blade cuts away the matted mass of roots or sticks up to an inch in diameter. The water which



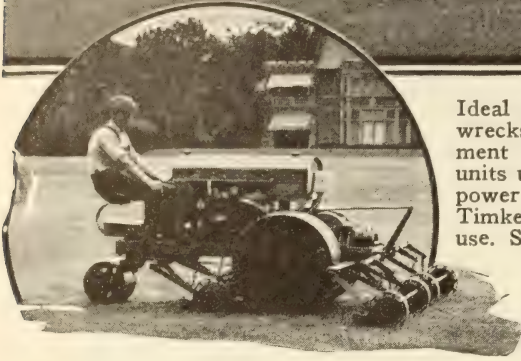
ROTATING NOZZLE WITH ROOT CUTTER
FOR SEWER WORK

revolves the root cutter washes away the loosened fibers, roots and sticks, and at the same time is claimed to give the sewer a thorough cleaning.

New National Paving Brick Officers

The National Paving Brick Manufacturers Association, Engineers Building, Cleveland, Ohio, has announced the election of the following officers: O. W. Renkert, President of the Metropolitan Paving Brick Company, Canton, Ohio, as Chairman of the Board of Governors, succeeding Spencer M. Duty, President of the Medal Paving Brick Company, Cleveland, Ohio. R. T. Hutchins, Vice-President and Sales Manager of the Mack Manufacturing Company, Wheeling, W. Va., has been elected President of the Association, succeeding O. W. Renkert. Will P. Blair, Cleveland, Ohio, is First Vice-President, and C. C. Barr, President of the Barr Clay Company, Streator, Ill., Treasurer; Edward E. Duff, Jr., Cleveland, Ohio, Executive Secretary; Miss B. L. Beller, Cleveland, Ohio, Assistant Treasurer; and Stanley A. Knisely, Cleveland, Ohio, Assistant Secretary.

A 6 per cent increase in 1922 shipments over those of 1921, despite the railroad strike, coal strike, and subsequent car shortage indicated the demand of communities generally for brick streets and roads. It is the opinion of the Board that if no such obstacles occur during 1923, this year will show a very material increase.



Ideal Triplex mowers ignore the punishment that wrecks the cutting units of other grass cutting equipment for two reasons. First, the "Bulldog" cutting units used are made in the Ideal factory especially for power work. Extra-heavy, of special steels and with Timken bearings, they endure the roughest, hardest use. Second, the cutting units can be raised or lowered by the operator without leaving his seat when going over rough places or drives.

We have demonstrated the Ideal Triplex in places where no other mowers dared follow. No other mower will cut a greater acreage under similar working conditions. No other is so free from repairs and has such prompt service available. Write for our literature.

Ideal Power Lawn Mower Company

R. E. Olds, Chairman

400 Kalamazoo Street, Lansing, Michigan

New York, 13-19 Hudson St.

Chicago, 11 East Harrison St.

Dealers in all Principal Cities

IDEAL Power Lawn Mowers

(50)

Write For This Free Beautiful Book Today

Learn How to Improve Your City Lawns and Cut the Upkeep Expense

Here's a mower that will solve your grass-cutting problems. Has the mechanical refinements of an automobile, yet sturdy as a tractor—simple, fool-proof, mechanically perfect. It welcomes every test. Used and endorsed from coast to coast.

The 4-Acre Power Lawn Mower

quickly pays for itself in labor saved. Does the work of 4 to 5 men with hand mowers. Cuts a 24-inch swath—4 to 5 acres a day at less than 40 cents a day for fuel and oil. No other power mower handles so easily around trees, shrubs, flowerbeds. Easily sharpened on its own power without removing cutting wheel. Cuts on a 30 degree incline.

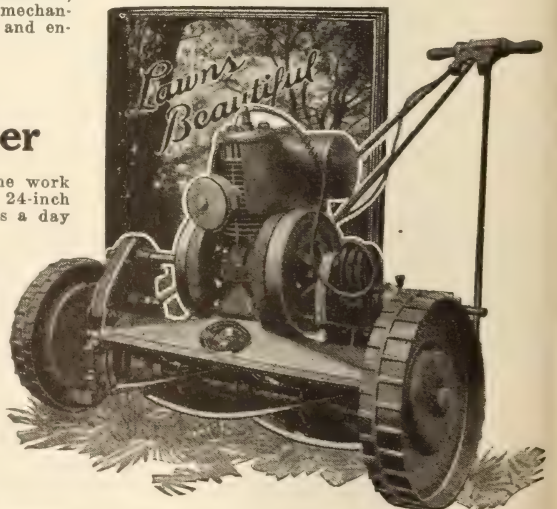
The book describes it in detail and gives abundant proof in word and pictures of the superiority of the 4-Acre Power Lawn Mower.

Drop a postal card in the mail today.

Jacobsen Manufacturing Co.

Dept. E., Racine, Wis., U. S. A.

The 4-acre cuts a 6-inch growth of June grass, wiry fescue grasses as smooth as velvet. Operates on unreasonable grades.



New Commercial Engineer with King

The King Manufacturing Company, Chicago, Ill., has announced that Otis L. Johnson, well known as engineer and lecturer on matters of illumination for the Benjamin Electrical Manufacturing Company, has been appointed commercial engineer for the King Manufacturing Company.

Mr. Johnson has been very active in advancing the cause of illumination, working on committees of the Illuminating Engineering Society and the National Electric Light Association, and lecturing before chambers of commerce, Rotary clubs and other organizations all over the United States. He has also served as Chairman of the Chicago Section of the Illuminating Engineering Society, and is now serving as a National Vice-President of that organization.

Charter Company Purchases Mietz Line

The Charter Gas Engine Company, Sterling, Ill., has announced the purchase of the entire Mietz oil engine business, heretofore carried on at 128-138 Mott Street and 430 East 19th Street, New York City, by the August Mietz Corporation and the Reliance Oil Engine Corporation. This effects a merger and consolidation under one management of two of the oldest internal combustion engine companies.

The Mietz oil engine was first built in 1895 by Mietz & Weiss, and since that time there have been placed in service some 375,000 horsepower in all parts of the world. The first Charter gasoline engine was built in 1886 and is claimed to have been the first commercially successful engine to use liquid fuel.

The Charter Gas Engine Company is now moving all the physical assets comprising the Mietz engine to its plant in Sterling, Ill., and in the meantime is filling repair orders for New York City. A portion of the personnel of the August Mietz Corporation organization has been engaged for work by the Charter Gas Engine Company, insuring a thorough working knowledge of the manufacture of Mietz engines.

Gas Street Lamp Installations

In addition to the list of cities given in the February, 1923, issue of THE AMERICAN CITY, the following cities have recently installed additional Welsbach street gas lamps: Granite, Okla.; Brownwood, Texas; Glen Ridge, N. J.; Worcester, Mass.; San Francisco, Calif.; Limestone, N. Y., and Coleman, Texas.

Service Motors, Inc.

Announcement has been made that Service Motors, Inc., a Delaware corporation, has taken over the business of the Service Motor Truck Company, Wabash, Ind., and will continue to build Service motor trucks and Service railroad motor coaches. The new firm has assets in excess of a million dollars. This is a result of the reorganization plans started last November for the Service Motor Truck Company, and

assures adequate capital to meet all needs for manufacture and further expansion.

Paul Moore, who is the President of the new company, has been with the Service Motor Truck Company for eight years and is thoroughly familiar with all the details involved in the manufacture and distribution of trucks. He has had charge at various times of sales, advertising and production departments of the Service trucks.

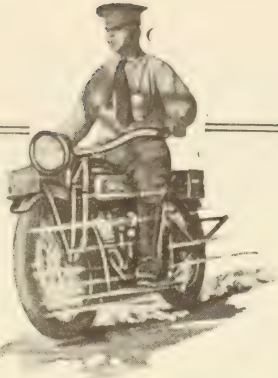
Home and City Beautiful Exposition

Final arrangements for the American Home and City Beautiful Exposition, to be held on the Million Dollar Pier in Atlantic City, June 16 to September 8, are now nearing completion. American manufacturers have shown unusual interest in the Exposition because of the encouragement given to an educational program in home and city beautification. The management of the Exposition is in the hands of A. Conrad Ekholm, Million Dollar Pier, Atlantic City, N. J.

All of the exhibit floor space on the Million Dollar Pier in excess of 100,000 square feet is to be used for this Exposition, which will have eight principal groups with allied classifications as follows: public and private buildings; materials, equipments and furnishings; the garden, seeds, accessories and supplies; art, sculpture and ornaments; musical instruments and reproducers; The City Beautiful, embracing municipal improvements, hygiene, sanitation and accident prevention; pure food products, confections and beverages; recreation, athletics, resorts and travel information, and a section devoted to radio.

The municipal exhibits will cover not only the general requirements of a city, but will have reference to the needs of the replanned city and the building of new cities along modern city planning lines. In the "City Beautiful" section of the Exposition there will be shown model streets, gardens, parks and good roads, and other exhibits to promote community progress.

In connection with the Exposition, it is planned to hold a contest in which prizes will be offered by the management for the most attractive public squares and war memorials in American cities. All communities throughout the country will be invited to send photographs, which will be prominently displayed during the period of the Exposition. A number of distinguished city planners and others who have been prominent in city beautification movements have been invited to serve on the City Beautiful Committee, and acceptances have already been received from the following: John Nolen, city planner, Cambridge, Mass.; Nelson P. Lewis, Chief Engineer of the Plan of New York and Its Environs; Carl Bannwart, Superintendent, New Jersey Shade Tree Commission; Andrew Wright Crawford, Secretary, Art Jury, Philadelphia; Harold W. Dodds, Secretary, National Municipal League; Harold S. Buttenheim, Editor, THE AMERICAN CITY. Members of this committee will be chosen to act as a Board of Judges in the contest.



Col. A. F. Foote of Massachusetts Says—

"I give my strongest opinion that a State Police should be equipped with as many motorcycles as possible."

Massachusetts State Police at present are equipped with 70 INDIAN Motorcycles.

Here's Col. Foote's letter in part.

Boston, Mass., March 15, 1923.

"Last year had approximately 40 (INDIANS) in operation. The motorcycle troopers covered 302,000 miles, including the very worst roads in back country. Some 800 arrests made, from murder to misdemeanors. Approximately \$50,000 of stolen property and fines recovered. Violation of motor vehicle law, over 300; persons warned, but not arrested, probably over 1000.

No question whatever would have been very much handicapped, if not equipped with motorcycles. The horse covers not over 30 miles a day, the motorcycle over 200—and kept constantly in service.

Upkeep and maintenance very reasonable.

Practically every crime committed outside city limits has an automobile involved, for that reason it is absolutely essential that police be equipped with rapid means of transportation.

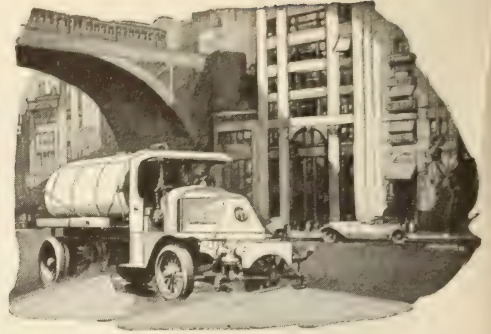
Col. Alfred F. Foote, Commissioner."

Write Dept. A-5 for our special police booklet,

"Maintaining Law and Order."

HENDEE MANUFACTURING CO.
SPRINGFIELD, MASS.

Indian
-a police go getter



A Credit to your Administration

THE MACK combination flusher and sprinkler doing its work effectively and economically on any highway reflects credit upon the community's administration.

This particular municipal equipment possesses many exclusive features in addition to the well-known excellence of Mack quality and construction. It has a single engine system; ample power for both truck and pressure pump; low maintenance cost; one man operation.

Our engineering department is well equipped to analyze any specific problem of motorizing municipal equipment. An inquiry does not incur the slightest obligation on your part.

**INTERNATIONAL
MOTOR COMPANY**

25 Broadway New York City

Branches owned by this company operate under the titles of: "MACK MOTOR TRUCK COMPANY" and "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION"

Capacities: 1½ to 7½ tons. Tractors to 15 tons.

PERFORMANCE COUNTS



Let us prove just how you get more for your money when you buy a ~~~ Modern Design **FEDERAL** Truck



In Public Service Work.

Federal trucks are doing splendid work for public service corporations. This one is a special tower wagon designed by Federal engineers with a hydraulic hoist mechanism. It also has special compartments and boxes for tools and equipment. It is operated by the city owned Detroit Street Railways.

*Write for Booklet S. 10, telling more
about Federal Trucks in your business*

FEDERAL MOTOR TRUCK CO.
Detroit, Michigan

General Motors Trucks



Firms who specialize in municipal work of various kinds have taken the experience of municipalities as a guide and have adopted GMC trucks for their hauling equipment. Mr. W. F. Kerwin, an Oregon well digger, who has mounted a rig on his GMC, says, "We drilled 44 wells in 1921 and covered a 30 mile radius with the trucks. Power—the GMC has worlds of it—Can move the rig for \$2.00, where it used to cost \$100 with horses.

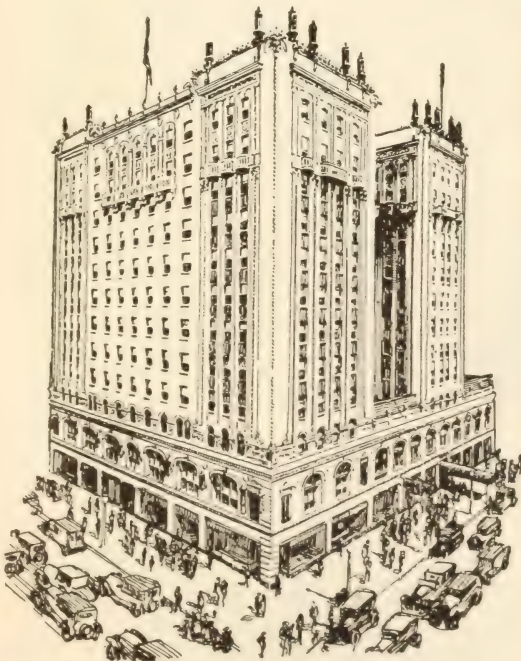
G M C chassis list at the factory as follows; 1-ton, \$1295; 2-ton, \$2375; 3½-ton, \$3600; 5-ton, \$3950; tax to be added.

GENERAL MOTORS TRUCK COMPANY

Division of General Motors Corporation

Pontiac, Michigan

DEALERS AND SERVICE STATIONS IN MOST COMMUNITIES



Hotel Sheridan-Plaza

CHICAGO

Sheridan Road at Wilson Avenue

Realizing the greater advantages of location, thousands of visitors to Chicago, whether on business or pleasure, now prefer the large hotels of the North Shore. The beautiful new Sheridan Plaza is "Uptown Chicago's most favored hotel." Music and dancing every evening. Moderate rates in the restaurant and Narcissus Grill cafeteria. Eighteen minutes from downtown; elevated express and surface lines; motor busses to and from downtown, through Lincoln Park, stop at the door.

European plan, Excellent rooms, with private bath, \$3 a day and up. Reservations are advisable. Exceptional garage accommodations.



Is Your City as Well-Protected as Dallas, Texas?

L. W. Brown,
Dallas Chief of Police,
said on March 8:

"Our Harley-Davidsons are good investments. They have and will pay for themselves, several times over, in fines collected and in assisting in the maintenance of the law. I heartily recommend the Harley-Davidson to any Police or Municipal Department—for endurance, long service, speed and low upkeep costs."

MOTORIZED bandits and other "traveling crooks" know that Dallas is a good city to stay away from. And drunken drivers and reckless speeders have a keen respect for the Dallas Police Department.

Eighteen Harley-Davidson-mounted officers speed swiftly about the city—day and night. The very fact that one of them is apt to be here, there, or anywhere, prevents a lot of law-breaking.

Dallas police use Harley-Davidsons *exclusively*. No other motorcycle will do. More than 1100 cities, towns and counties feel the same way about it—they've tried other motorcycles and have settled on Harley-Davidsons.

*How well is YOUR community protected?
Write on your letter-head for special literature
on "America's Police Motorcycle." No obligation
to you.*

HARLEY-DAVIDSON MOTOR CO.
MILWAUKEE, WISCONSIN

Harley-Davidson The Motorcycle



YOUR INSURANCE OF DELIVERY

35000 Tons of Kyrock on Storage April 11, 1922, in the Yards
of the Kentucky Rock Asphalt Co. at Bowling Green, Ky.

Uniformity---Service---Responsibility

Uniformity of material has been the secret of the uniform success of "Kyrock"—the rock asphalt produced only by this company. Before the asphalt rock is quarried, it is core drilled and analyzed. The quarry faces are sampled and tested, and finally a laboratory analysis is run on each ton of the finished material before it leaves our plant.

"Kyrock" produced today is the same, by actual test, as that used in the famous Camp Knox Road, and on sections of the Dixie, Lincoln and Johnson Highways. "Kyrock" has removed the hazard of surface failure, always present in artificial bituminous mixtures.

The Kentucky Rock Asphalt Company keeps close contact with all "Kyrock" construction through its engineering department. Engineers and contractors inexperienced in building rock asphalt pavements are given personal assistance to insure success of the work.

"Kyrock" service begins when the plans are drawn and does not end until the pavement is successfully completed.

Experienced in the many difficulties of producing Kentucky Rock Asphalt and removing it from the rugged country where it is found, this company is extremely careful to protect the interests of engineers, officials and contractors. A large storage of material, built up during the winter months, insures against annoying and costly delays in delivery. No orders are accepted in excess of our known ability to deliver.

Our engineering department has prepared typical specifications and cross-sections for new construction and reconstruction on all standard types of bases. We shall be glad of an opportunity to consult with you or to forward literature describing the production and uses of "Kyrock." Write for booklet D-4.

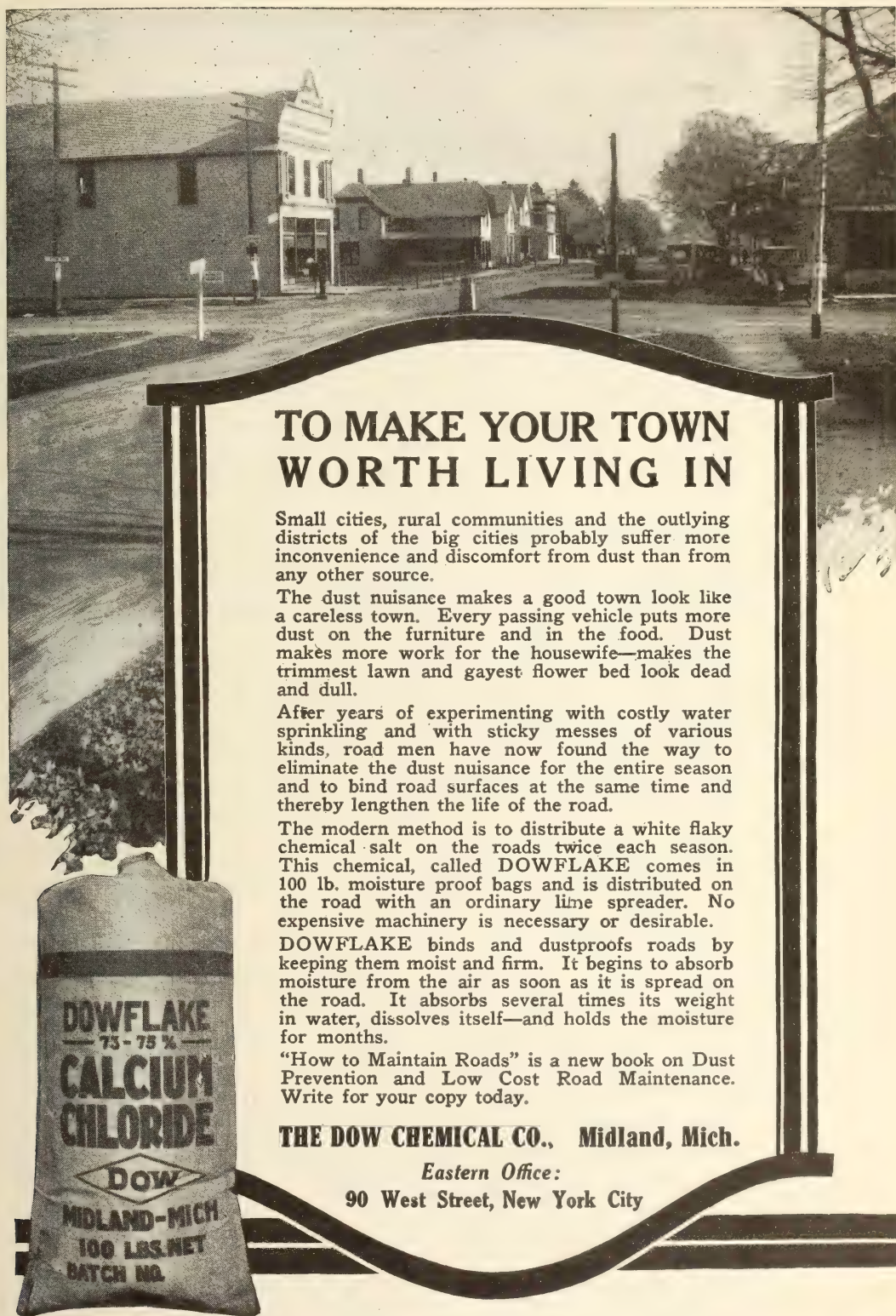
Kentucky Rock Asphalt Co.

Incorporated

712-718 Marion E. Taylor Bldg.,

Louisville, Ky.

Kyrock Means Uniformity, Service and Responsibility.



TO MAKE YOUR TOWN WORTH LIVING IN

Small cities, rural communities and the outlying districts of the big cities probably suffer more inconvenience and discomfort from dust than from any other source.

The dust nuisance makes a good town look like a careless town. Every passing vehicle puts more dust on the furniture and in the food. Dust makes more work for the housewife—makes the trimmest lawn and gayest flower bed look dead and dull.

After years of experimenting with costly water sprinkling and with sticky messes of various kinds, road men have now found the way to eliminate the dust nuisance for the entire season and to bind road surfaces at the same time and thereby lengthen the life of the road.

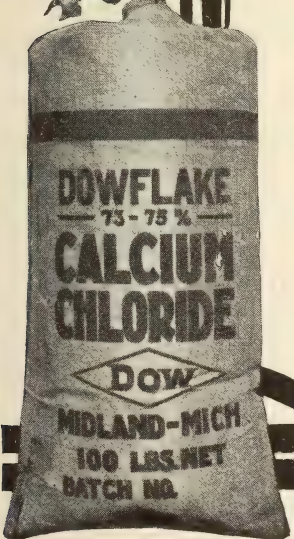
The modern method is to distribute a white flaky chemical salt on the roads twice each season. This chemical, called DOWFLAKE comes in 100 lb. moisture proof bags and is distributed on the road with an ordinary lime spreader. No expensive machinery is necessary or desirable.

DOWFLAKE binds and dustproofs roads by keeping them moist and firm. It begins to absorb moisture from the air as soon as it is spread on the road. It absorbs several times its weight in water, dissolves itself—and holds the moisture for months.

"How to Maintain Roads" is a new book on Dust Prevention and Low Cost Road Maintenance. Write for your copy today.

THE DOW CHEMICAL CO., Midland, Mich.

Eastern Office:
90 West Street, New York City





WARRENITE-BITULITHIC, KING OF BLACK TOPS
IS BEST ON ALL BASES

The claims we make for Warrenite-Bitulithic Pavement are founded on knowledge of its performance as well as on confidence that it is fundamentally right for the purpose for which it is made—and that is, to give long, low cost service.

*May we tell you more
about it?*

Warren Brothers Company

EXECUTIVE OFFICES:

9 Cambridge Street, BOSTON, MASS.

DISTRICT OFFICES:

New York, N. Y.	Chicago, Ill.	Oakland, Cal.
Los Angeles, Cal.	Portland, Ore.	Phoenix, Ariz.
Richmond, Va.	Memphis, Tenn.	St. Louis, Mo.
Toronto, Ont.	Minneapolis, Minn.	Utica, N. Y.
Winnipeg, Man.	Vancouver, B. C.	Washington, D.C.
New Orleans, La.	Harrisburg, Pa.	Dallas, Tex.
	Salt Lake City, Utah	

DIXON'S

SILICA-GRAPHITE PAINT
is a natural combination of silica and flake graphite. The vehicle is pure boiled linseed oil. It will not crack or peel off because of the natural elasticity of the flake graphite, while the silica furnishes the wear-resisting qualities. Because of these qualities, Dixon's Paint affords better and longer protection. By making frequent repainting unnecessary, it lowers the cost of paint upkeep.

Write for Booklet 107B
Joseph Dixon Crucible Co.
Jersey City, New Jersey
Established 1827

AMERICAN STEEL & WIRE COMPANY

American
Triangle Mesh
and
Electric Weld
Reinforcing
Fabrics

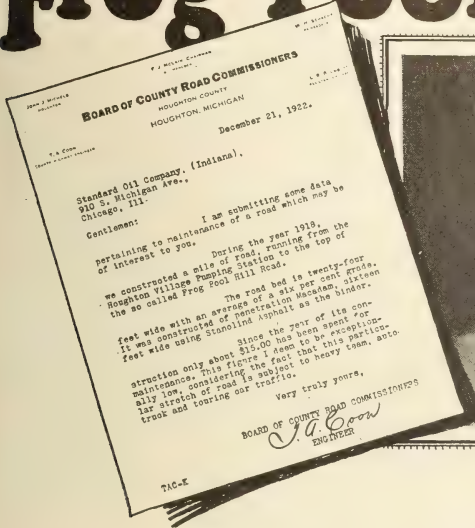
Wire fabric reinforcement for concrete roads ensures permanence

There is no form of road that is as economical, enduring and efficient as a concrete road. And when it is reinforced with steel wire fabric it is practically good for all time if the foundation and mixture is right.

Send for our new Road Building Book.

Chicago New York Boston Pittsburgh
Cleveland Denver San Francisco

Frog Pool Hill Road



\$3.75 a Year for Upkeep

EMPHASIZING the low upkeep and durability of roads constructed with Stanolind Paving Asphalt, the above letter is worthy of serious thought by those officials responsible for the paving and maintenance of the roads in their communities.

Frog Pool Hill Road, as Mr. Coon states, is subject to heavy team, truck and automobile traffic, and in addition, to the severe winter climate of Northern Michigan. Yet the above photograph—taken last August, four years after the road was built—clearly indicates that it is still in

good condition. And, *the total maintenance cost of one mile of this road for the entire four years, was around \$15.00, an average of only \$3.75 a year.*

Houghton County's experience with Stanolind Asphalt is by no means exceptional. Reports from other communities all tend to show that the low initial cost and the still lower maintenance cost of roads constructed with Stanolind Paving Asphalt make it the ideal road building material.

We have recently issued a booklet which tells the latest methods of constructing and maintaining bituminous pavements. It will be sent to you free, upon request.

STANDARD OIL COMPANY

(INDIANA)

942 S. Michigan Avenue

CHICAGO, ILLINOIS

When writing to Advertisers please mention THE AMERICAN CITY.

Open to Traffic in 10 Days!



Photo not retouched—
just as it is, no hair
cracks, a perfect sur-
face cured by Solvay
Calcium Chloride.

THE concrete on the road pictured above was placed October 5th and 6th and the road was opened to traffic on October 16th!

That shows a real saving of time not only for the contractor, who thus receives his money that much sooner, but for the Highway Engineer who thus is so much sooner enabled to turn to other work, and also there is a real service to the community, which is able to make use of the road so much sooner.

State and County Engineers, wherever Calcium Chloride curing has been used, are unanimous in their commendation. Results are certain with Solvay because it automatically proceeds with the curing. There is no worry concerning daily sprinkling, no expense for inspectors. Once Solvay is applied the curing goes ahead and you quickly have the road in use, a strong perfectly cured concrete highway.

Solvay may be obtained in drums containing 375 lbs. or in the moisture-proof, easy to handle 100-lb. bag, shipped from 50 conveniently located distributing points.

For CONCRETE CURING

use **SOLVAY**
Free Running
Calcium Chloride

The Solvay Method is cheaper, quicker, surer, more efficient than the old time covering methods. Let us prove it—write for our latest literature or send us details of your work and our engineers will give you the benefit of their experience without charge. Address

The SOLVAY PROCESS CO., Syracuse, New York



Naugatuck Valley, Connecticut State Highway. Elastite Expansion Joint concealed

Chouteau Ave. Viaduct, St. Louis, Mo. Elastite Expansion Joint used

Above — Mud Bay Bridge, Olympic Highway, Thurston County, Wash., Frank Weir, County Engineer, Union Bridge Co., Seattle, Builders. Elastite Expansion Joint used

To absorb expansion stresses in any concrete structure use Carey Elastite Expansion Joint

YEARS of successful experience have proved the efficiency of Elastite Expansion Joint in practically every type of concrete construction. It is accepted by engineers and contractors as a standard joint material that has long since passed the experimental stage, functioning effectively under all climatic conditions. It is easily installed at minimum labor cost and without waste, breakage, or joint-repairing.

Elastite Expansion Joint can usually be shipped in almost any quantity within twenty-four hours of receipt from the nearest of our seventeen distributing centers. Large stocks and production enable us to give rush service any day in the year to any section of the country. Send for sample and data.

THE PHILIP CAREY COMPANY
8 Wayne Ave., Lockland, Cincinnati, Ohio

Carey Elastite
TRADE MARK U.S. Pat. Office
EXPANSION JOINT
PROVED AND ACCEPTED

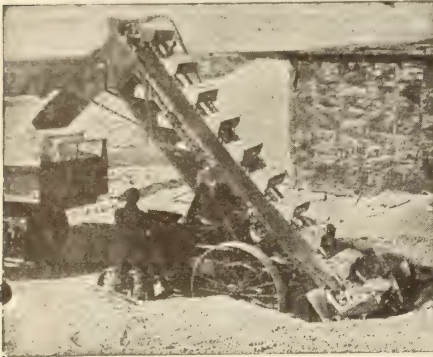
Carey Elastite Expansion Joint is an asphaltic body, formed of a high-grade asphaltic compound carefully refined and tempered, sandwiched between two walls of asphalt-saturated felt forming an elastic, compressible joint. It is made in lengths, widths and thicknesses as required, can be cut to crown or to any special shape and comes to the job ready to use.

Plastic in mid-winter!

Elastite Expansion Joint at below-zero temperatures is plastic and elastic. Elastite Expansion Joint retains plasticity in any temperature. It does not melt. It does not shatter.



35 Seconds per Cubic Yard



There's no secret about why Haiss Loaders have such wonderful capacity.

Average loading time for loading 173 truck loads averaging 3.36 cubic yards each, with a

HAISS TRUCK LOADER

That's the record made on a municipal job where the one loader served a fleet of nine trucks. Here are the details of a week's work:

No. Trucks	No. Trips	Av. Yds. Per Trip	Av. Loading Time per Trip	Av. Loading Time per cu. yd.
6—3-ton	155	2.72	1 min. 46 sec.	39. sec.
3—4½-ton	18	4.00	2 min. 3 sec.	30.8 sec.

The best single performance was loading 3 cu. yd. in 55 seconds—and this in the course of a regular day's work, not a stunt performance.

It's because Haiss Loaders dig with toothed buckets, feed the material into the buckets with their patented, positive self-feeding propellers and "crowd" slowly right into the pile, while digging.

Ask for Bulletin 521.

The Geo. Haiss Manufacturing Co., Inc. 143rd St. and Rider Ave., New York

HEIL DUMP UNITS DO CITY WORK MORE ECONOMICALLY



For The Ford! Dump Body with hinged sides. Use for hauling ashes, cinders, rubbish, gravel, coal, grain, wood, brick, tile, piping and well suited for hauling sod.

Capacity 60 cu. ft. Double acting tail gate. Heil Underneath Hand Hoist for dumping loads up to 1½ tons.

Bodies now in stock; ready for shipment. Place your order at once.

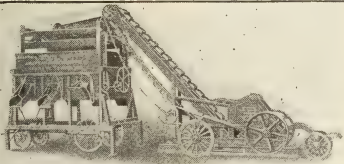


THE HEIL CO.

1242-60 26th Ave., Milwaukee, Wis.

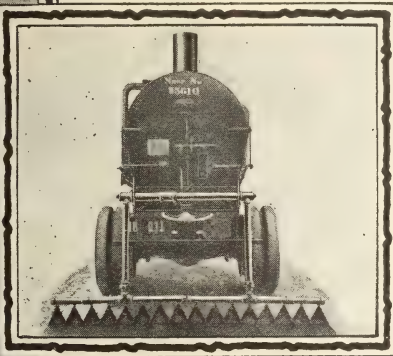
We make a special proposition on dumping equipment to cities that wish to equip trucks allotted from Surplus War Materials. Among these trucks are: Pierce, Class B Liberty, Riker, Packard, F. W. D., etc.

Thousands
of road makers
look to us to supply
the machinery to make
roads as shown in the
other circle. We will
welcome the op-
portunity of
serving you.

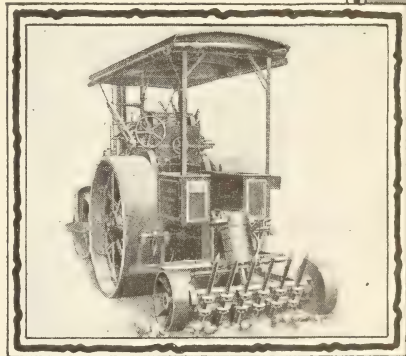


NO. 4 CHAMPION STEEL ROCK
CRUSHER, Mounted, with Elevator,
Screen and Portable Stone Bin.

We furnish a complete line of Road
Building Machinery. Six different sizes
of Road Graders, Portable and Stationary
Rock Crushers, Elevators, Screens, Con-
veyors, Bins, Oiling Machinery, Heating
Kettles, Road Drags and Culvert Pipe.
If you are looking for high grade machin-
ery and genuine service we would like to
hear from you.



CHAMPION HEATING DISTRIBUTOR. For applying all grades of
bituminous binders.



MONARCH STEAM ROAD ROL-
LER, with Scarifier attached. Made
in 10 and 12 ton sizes.

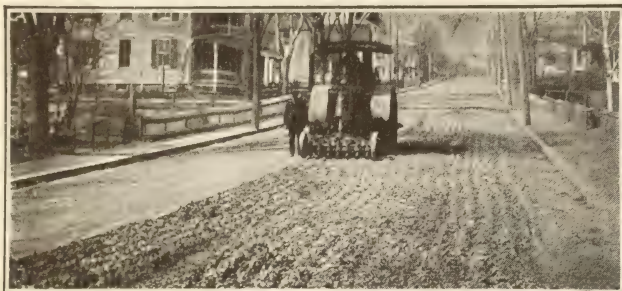
BOSTON · MASS.
NEW YORK · N.Y.
CHICAGO · ILL.
PITTSBURGH · PA.
PHILADELPHIA · PA.

The
**GOOD ROADS
MACHINERY CO**
INC.
KENNETT SQUARE, PA.

ATLANTA · GA.
PORTLAND · ORE.
SAN FRANCISCO
-AND-
LOS ANGELES · CAL.

OUR COMPLETE CATALOG
"EVERYTHING for the ROADMAKER"
WILL INTEREST YOU. IT IS FREE ON REQUEST

Buffalo-Pitts and Kelly-Springfield Rollers—Steam and Motor



All Types and Sizes

With or without Scarifier
attachment.

Helps you finish the job
on time.

*Send for catalog A for
complete information.*

THE BUFFALO-SPRINGFIELD ROLLER CO.
SPRINGFIELD **OHIO**

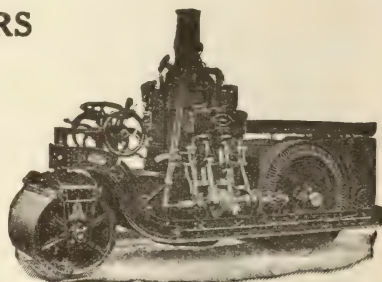
ERIE TANDEM PAVING ROLLERS

Includes everything that makes for the best in Road Rollers. They are strong, simple in construction—durable and economical and easy to operate. Our first roller built in 1887 is still doing its "bit."

Erie Rollers are guaranteed against breakage or wear for 5 years.

Write for illustrated material.

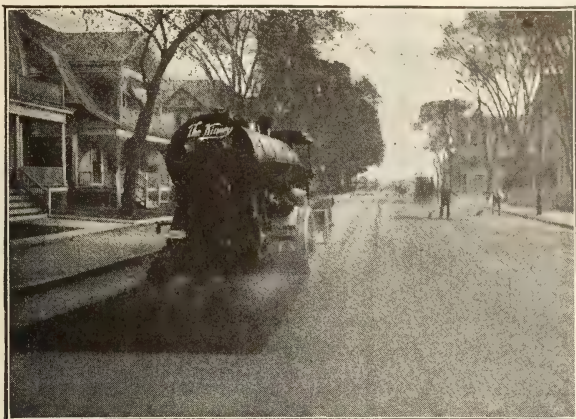
THE ERIE MACHINE SHOPS



ERIE, PA.

Do You Want Prices on Anything?

Readers of THE AMERICAN CITY desiring to secure catalogues or price lists on any sort of machinery equipment or supplies for municipal or county work are invited to state their wishes to the Catalog and Price List Department, The American City, 443 Fourth Ave., New York. One letter to us will secure you the information you desire free of all charge, and at a considerable saving of time and correspondence.



For Heating and Applying under Pressure all varieties of Bituminous Materials, Hot or Cold, for Road Construction, Maintenance of Dust Laying.

Heat and volume under instant control of operator. Positive pressure produced by the Kinney Pump.

Auto Heater and Distributor PATENT COMBINATION

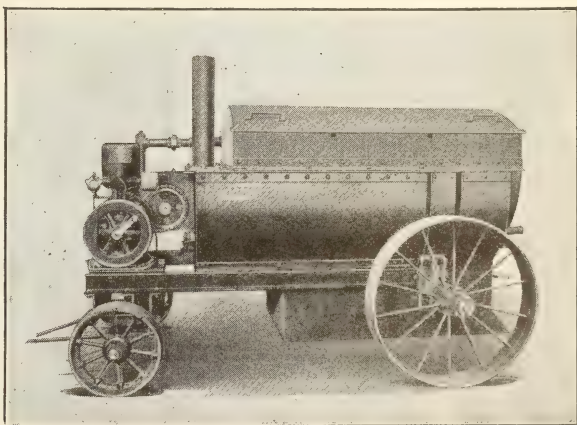


HANDY HEATER and SPRAYER

Especially adapted for Road maintenance, construction and general repair work. Contents constantly agitated while heating.

No burning or coking of materials, Pump, Piping, Hose, Nozzles, Automatically Heated.

No Steam Required.



Kinney Manufacturing Company

3529 Washington Street
BOSTON, MASSACHUSETTS

BRANCHES :

NEW YORK

PHILADELPHIA

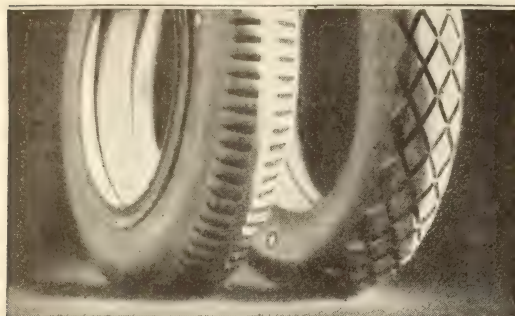
CHICAGO
SAN FRANCISCO

HOUSTON

KANSAS CITY



Constant, Economical Service



Wherever Goodyear Cord Truck Tires are used in municipal hauling they demonstrate their ability to reduce costs and improve service. There are special Goodyear Tires for special needs — Goodyear Cushions and Goodyear All-Weather Tread Solids. For assistance in determining the most practical tire for any work, call the nearest Goodyear Branch. Or, if more convenient, write direct to Goodyear, Akron, Ohio, or Los Angeles, California.

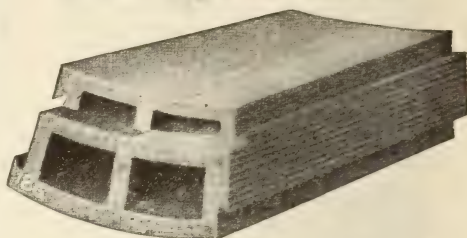
Goodyear Means Good Wear

GOODYEAR

Copyright 1923, by The Goodyear Tire & Rubber Co., Inc.

DICKEY SEGMENT BLOCKS FOR LARGE STORM SEWERS

30 inch to 108 inch diameter



Vitrified Salt-Glazed Clay Blocks which are permanent, acid-proof, gas-proof, decay-proof.

Smooth, glazed surface gives greater carrying capacity.

Construction is economical because the blocks are large and can be laid rapidly in all seasons.

Write for catalog

W. S. DICKEY CLAY MFG. CO.

ESTABLISHED 1885

203 New York Life Bldg.

KANSAS CITY,

MO.



AZTEC KOLMEND

Mends the holes in streets or roads including

ASPHALT

BRICK

CONCRETE

MACADAM

DIRT and GRAVEL

Write for particulars.

**THE UNITED STATES ASPHALT
REFINING COMPANY**

90 West Street,

New York City

A good way to judge Kelly Kats

The most convincing thing about Kelly Kats is their performance. If you have never seen them at work, just try these three tests.

First, watch them in action on a slippery street and note their traction.

Second, drive a truck equipped with Kats over a rough road and note how these tires absorb the bumps.

Third, compare the mileage figures of various types of tires and note how much greater average mileage Kelly Kats give.

Then if you are not convinced that Kelly Kats are the kind of tires you want on your trucks, nothing we might say will convince you.

*The first cost of Kelly Kats is less than pneumatics,
the final cost is less than ordinary solids*

**There are no Caterpillar tires
but Kelly Kats**

Kelly-Springfield Tire Company

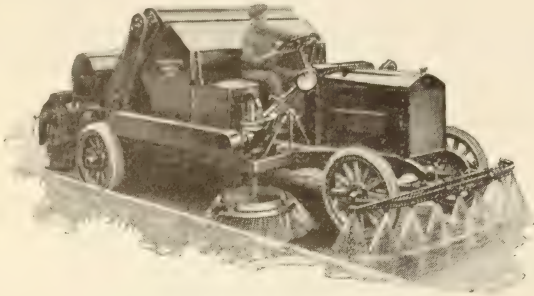
250 WEST 57th STREET
NEW YORK, N. Y.



KELLY KATS

THE TIRES WITH NINE LIVES

When writing to Advertisers please mention THE AMERICAN CITY.



A CLEAN CITY FOR 1923

Clean streets are an asset to any community. They react favorably on citizens and strangers alike, and are one of the best and most tangible indications of a progressive administration.

The street cleaning problem is one that can never be solved in the sense of ceasing further to exist, since dirt and filth will always continue to be deposited on our city streets; but Austin Motor Sweepers come closer to solving it than anything else.

Let us show you how they will make your resolution for "A Clean City for 1923" come true.

THE AUSTIN-WESTERN ROAD MACHINERY CO.

Factories and Home Office: CHICAGO

Branches in 22 Cities

FOR HANDLING CRUSHED STONE or SAND and GRAVEL



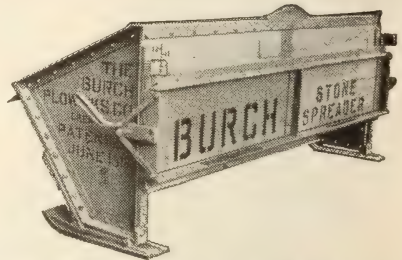
From cars to trucks the **RELIANCE PORTABLE CAR UNLOADER** will save more than its cost in one season.

Catalog and Price List on Request.

UNIVERSAL ROAD MACHINERY CO.
KINGSTON, N. Y.

New York Office, 114 Liberty St.

Boston Office, 141 Milk St.



Stop the Loafing

No need for a gang of men to follow your trucks when you deposit road material with the

BURCH SPREADER

Working from the back of your truck, it puts stone, slag or gravel on the roadbed just as you want it—of required depth and width, evenly and without waste.

No other single piece of equipment will save you more. We will be glad to tell you what contractors themselves say—we couldn't put it stronger about Burch Spreaders and Burch Car Unloaders. Write us.

The Burch Plow Works Company

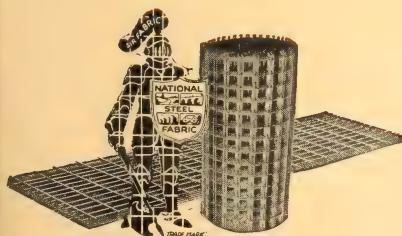
Dept. A-5,

CRESTLINE, OHIO



**For
Immediate
Shipment==**

**The world's largest
stocks of welded
steel reinforcing
made up in the
following styles:**



Furnished in Rolls or Sheets

National Steel Fabric—Standard Road Styles
(Furnished in Rolls or Sheets)

Style	Main Wires			Secondary Wires			Approximate Weight 100 Sq. Ft.
	Spacing	Gauge	Area	Spacing	Gauge	Area	
BF 88	4	8	.062	12	8	.021	29.6
BF 77	4	7	.074	12	7	.025	35.4
BF 66	4	6	.087	12	6	.029	41.6
BF 55	4	5	.101	12	5	.034	48.4
CF 77	6	7	.049	12	7	.025	27.0
CF 66	6	6	.058	12	6	.029	31.8
CF 55	6	5	.067	12	5	.034	37.0
CF 44	6	4	.080	12	4	.040	45.8
CF 33	6	3	.093	12	3	.047	51.0
CF 06	6	0	.148	12	0	.029	65.3
CC 88	6	8	.041	6	8	.041	30.0
CC 77	6	7	.049	6	7	.049	35.7
CC 66	6	6	.058	6	6	.058	42.0
CC 55	6	5	.067	6	5	.067	48.8
CC 44	6	4	.080	6	4	.080	57.8

Other styles (various spacings and gauges of wire) can be furnished for all concrete reinforcing purposes such as roads, buildings, reservoirs, pipe, etc.

Phone, write or wire our nearest office.

NATIONAL STEEL FABRIC COMPANY
(Subsidiary of Pittsburgh Steel Co.)

708 UNION ARCADE

PITTSBURGH, PA.

Offices

Chicago, Ill., 761 McCormick Bldg. New York, N. Y., Equitable Bldg.
Philadelphia, Pa., Harrison Bldg. St. Louis, Mo., D20 Railway Exch. Bldg.
Atlanta, Ga., 604 Walton Bldg. San Francisco, Cal., Badt-Falk & Co., Call Bldg.
Los Angeles, Cal., Badt-Falk & Co., Lowe's State Bldg.

World's Largest Manufacturers of Welded Steel Fabric

NATIONAL STEEL FABRIC CO

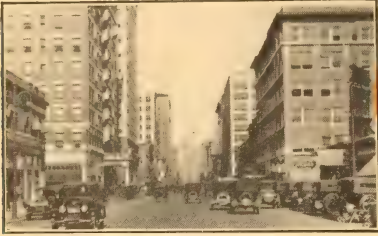
Subsidiary of PITTSBURGH STEEL CO

UNION ARCADE BUILDING

PITTSBURGH, U.S.A.

THE AMERICAN CITY

SERVICE!



Eleven Years—

The Texaco Sheet Asphalt pavement on Main Street, Houston, Texas, has carried this kind of traffic for eleven years without maintenance.



Fourteen Years—

Texaco Asphaltic Concrete has served the city of Newark, N. J., on N. 13th Street for fourteen years.

When can you say: "This is a proved pavement?"

At the end of a single year of service, when traffic and climate have left the pavement unmarked? Hardly.

At the end of five years when that original fine, smooth wearing surface continues to stand up firmly under the pounding and pushing of heavy traffic, and the internal expansion and contraction due to temperature variations? Yes, that promises to be a good pavement.

But, when can you say: "This IS a good pavement?"

It's when the pavement has stood up ten,

TEXACO



New York
Philadelphia
Richmond
Boston
Jacksonville
Atlanta
New Orleans
Memphis

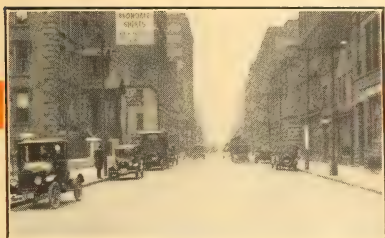
The Texas Company, U. S. A.

ASPHALT SALES DEPARTMENT

17 Battery Pl.,

New York City

Chicago
Cleveland
Oklahoma City
Kansas City
Houston
Minneapolis
Dallas
St. Louis



Eleven Years—

Sycamore Street, Cincinnati, Ohio, was paved with Texaco Sheet Asphalt in 1912. It has carried commercial traffic like this for eleven years without maintenance.



Eleven Years—

Grand Boulevard, one of the principal thoroughfares of the city of Chicago, was paved with Texaco Asphaltic Concrete in 1912.

eleven, twelve, thirteen, fourteen years under the heaviest kind of traffic and a wide variation of temperature with little or no maintenance. Then you may confidently say: "Yes, this is a good pavement."

Today more than five hundred American cities and towns are traveling over Texaco Asphalt pavements. Scores of these pavements have given from 10 to 14 and more years of real service under heavy traffic and varied changes of weather. Other scores are nearing the age of these older Texaco pavements, all destined to give that same incomparable service. The adhesive, waterproof, resilient and lasting qualities of the Texaco Asphalt Cement which goes into these pavements are the reasons for their success.

TEXACO

The Texas Company, U. S. A.

ASPHALT SALES DEPARTMENT

17 Battery Pl.,

New York City

New York
Philadelphia
Richmond
Boston
Jacksonville
Atlanta
New Orleans
Memphis

Chicago
Cleveland
Oklahoma City
Kansas City
Houston
Minneapolis
Dallas
St. Louis



When writing to Advertisers please mention THE AMERICAN CITY.

**NO
PARKING
HERE**

Style
No. 120

\$ 7.85

The discs are made of 14 gauge Armco Ingot Iron, 12 inches in diameter. Two plates are riveted back to back on a One-Inch standard, and the letters carved into the face of each plate. An iron spacer one inch wide is placed between the plates and securely held by the Lyle bead placed around the outside edges of discs. Red Field of two baked coats of elastic spar enamel. Letters painted Flake Aluminum, standard and base black. Complete with heavy 26-pound cast iron base.



**It Can Be
Read At
Night**

***Because*
The Lyle Letter Is
CARVED**

The headlight rays of a motor car, striking the Lyle Sign at any angle, are caught in the sharp side walls and deep base of the carved letters and reflected back by the hundreds of mirror faces of the pure flake aluminum. So the sign is luminously readable on the blackest night. Light rays from any angle cannot slide off the sign. They are caught right there. No motorist can miss the Lyle Sign's message. It will guard night and day any station you place it at.

And Lyle Signs guarantee this legibility under any abuse of traffic service. The letters cannot be knocked off, nor chipped or broken because they are a part of the sign plate—carved into the heavy Armco Iron plate.

THE BASE IS A TOWER OF STRENGTH

The Base of Lyle Traffic Signs is a special Lyle feature construction, giving untold strength. We'd like to explain it to you with illustrations.

**LYLE SIGNS ARE THE ONLY
SIGNS WITH CARVED LETTERS**

**YOU CAN USE THIS AS AN ORDER BLANK OR A
REQUEST FOR INFORMATION**

LYLE SIGNS

171 - 27th Ave., S. E.,
Minneapolis, Minn.

Please enter our order for (Quantity)....."NO PARKING HERE" Signs,
at \$7.85 per sign.

Please send catalog and prices on other traffic signs of special wordings and on your other
signs.

Name.....Official Position.....

Town.....State.....

RUSSELL "HI-WAY PATROL"

We have certainly improved this machine and it stands today a mechanical marvel without an equal. For road maintenance it has many distinctive features—receding platform allowing operator full view of work—long wheel base—large wheels—blade lowered and raised by worm gear. It is easy riding and requires only one man and two horses.

Russell Equipment includes 7 sizes in Road Machines—ranging from the giant Russell Mogul, weight 9000 lbs., to Russell Gem, weight 650 lbs. Also Scarifiers, Drags, Drag Lines, Gravel Screening and Loading Outfits, Culverts, Steel Beam Bridges, etc.

A very complete catalog of special interest to all road builders—sent free and postpaid.

RUSSELL GRADER MANUFACTURING CO.
FACTORY AND GENERAL OFFICES
MINNEAPOLIS, MINN.

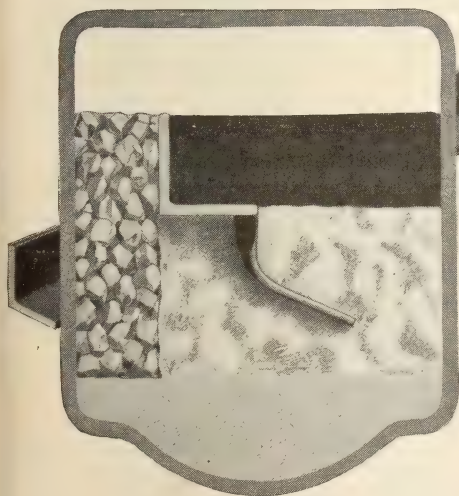
*Affiliated Plants—Cicero, Ill., North Kansas City, Mo.,
Memphis, Tenn., Dallas, Tex.*

*Representatives in all
principal cities.*



RUSSELL
ROAD EQUIPMENT

Save the Road Edge



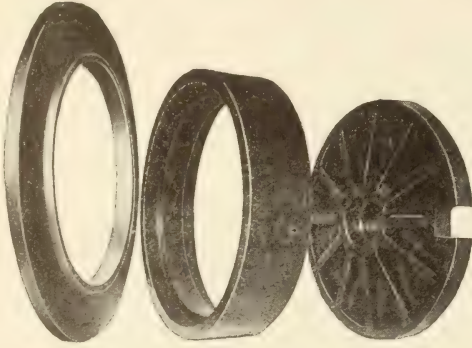
International Steel Paving Guard

Wherever International Steel Paving Guards have superseded concrete header curbs for protecting pavement edges, all disputes as to responsibility of making repairs have been avoided. These guards not only insure permanent pavement edge protection and enable track work to be carried on without disturbing the pavement but they distinctly define the sphere of responsibility of the road and railway engineers.

INTERNATIONAL STEEL TIE CO.,

Cleveland, Ohio

Economy Reversible Manhole Cover Will Save Your Pavement



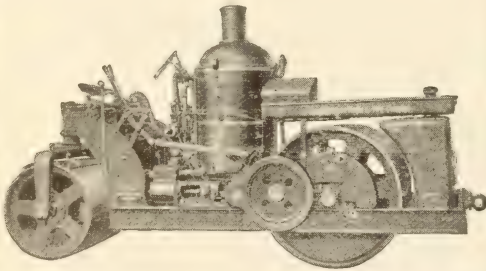
Curbs can be reversed or renewed without tearing up any part of the pavement, the reversible feature giving double the wear of the ordinary curb, or a saving of 60% of the cost on three installations of old style curbs.

Will grant licenses to reliable foundries.

**CAMPBELL, WYANT & CANNON
FOUNDRY CO.**

Muskegon

Michigan



GALION ROLLERS

Galion Rollers, either tandem or three wheel type—double cylinder steam or two cylinder opposed motor—are noted for their ease of operation, and the continuous, constant and reliable service characteristic of Galion Equipment.

**Write for Special Roller
Catalog and Prices.**

**GALION IRON WORKS & MFG.
COMPANY**

Main Office and Plant, Galion, Ohio.

"TARCO" Welded Equipment

Pumps
Conveying
Spouts
Asphalt Kettles
Pouring Pots
Carrying Pots
Brick Fillers
Special Pump-
ing Outfits
Joint Fillers



Pressure Ma-
chine
Gravel Washers
Loaders
Street Cleaners
Street Rubbish
Cans
Can Carriers
Push Brooms
Double Can
Carriers

Write for Catalog B and Prices

TARRANT MANUFACTURING CO.
SARATOGA SPRINGS NEW YORK

GODWIN STEEL PAVING GUARDS

PROTECT THE EDGES OF
STREET, ROAD, CURB &
STREET RAILWAY
PAVING. . . .

*Write for Illus-
trated Cata-
log No.
23.*



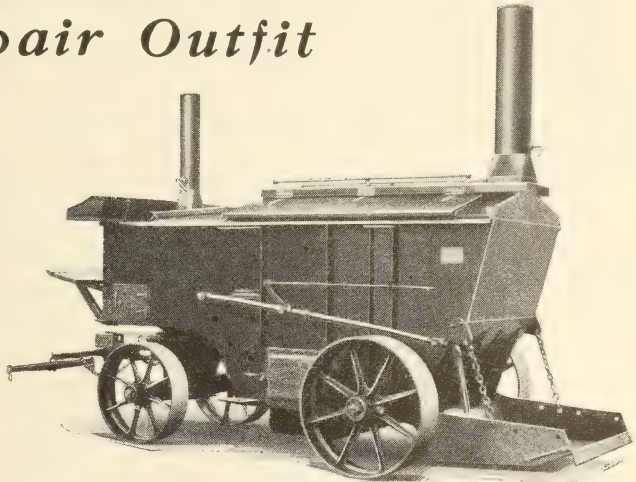
Various
Sizes and
Shapes adapt-
able to all types &
character of paving.

W. S. GODWIN CO., Inc.
12 E. Lexington St., Baltimore, Md.

Economical **ROAD MAINTENANCE!**

THE ANDRESEN *Road Repair Outfit*

The only complete road repair unit for making hot mixed bituminous paving aggregates for repairing any kind of street or road paving.



The Andresen Road Repair Outfit keeps pavements smooth all of the time, and by keeping them smooth reduces the cost of maintenance. With it durable repairs are made the year round and at the time when small breaks first appear. It embodies every device needed for repair work without requiring the purchase of any auxiliary equipment.

Leading Road Officials have adopted the Andresen Road Repair Outfit for efficient maintenance work. The story of the saving made possible in their departments through the use of this equipment is interesting and will be gladly told.

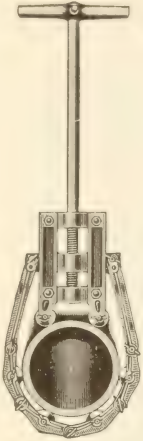
Send for Descriptive Booklet

LITTLEFORD BROS.

500 EAST PEARL ST.

CINCINNATI, OHIO

Cuts Pipe in the Trench



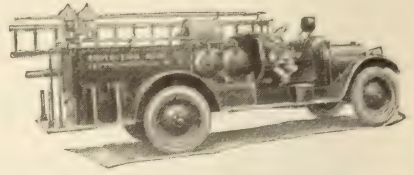
The work can be completed in less time than is usually consumed in digging the hole required for a hammer and chisel cut. Test the Ellis Pipe Cutter on the job you are doing. You need not remit until satisfied.

Ellis & Ford Mfg. Co.

38 Piquette St.,

Detroit, Mich.

"DELUGE"—REO



THE NEW DELUGE ROTARY FIRE PUMP mounted on this REO Chassis is giving the best of service. It provides perfect fire protection; a speedy and dependable motor for a quick call—a wealth of power and endurance when pumping on the job.

There's a DELUGE for your city. FORD, REO, DODGE, STEWART, PIERCE-ARROW and other standard chassis, fully equipped for service. Write for circulars. Ask for folder explaining the New, Improved DELUGE ROTARY FIRE PUMP.

THE PROSPECT MFG. CO.
PROSPECT, OHIO



10 Gallon Capacity

CONNERY'S Tar and Asphalt Heaters

Non-Leakable Welded—"Held by the Weld." 20 Styles.

10 to 1000 Gallon Capacity Carried in Stock.

This kettle (10-gallon capacity) is ideal for road contractors and is especially made for small patch work where there are a considerable number of small holes to be properly filled up with gravel or crushed stone and cemented with bituminous binder. The inside pot lifts out and can readily be used as a pouring pot.

Send your name for illustrated material on all sizes and styles.

CONNERY & CO., Inc.
4000 N. SECOND STREET, PHILADELPHIA, PA.

FOR CLEAN STREETS AND CATCH BASINS

—The ELGIN Line—

The AUTOSWEEPER
A Motor Street
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A Motor Pick-Up
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SPECIAL SPRING RATES

EUROPEAN PLAN... \$2.50 and up

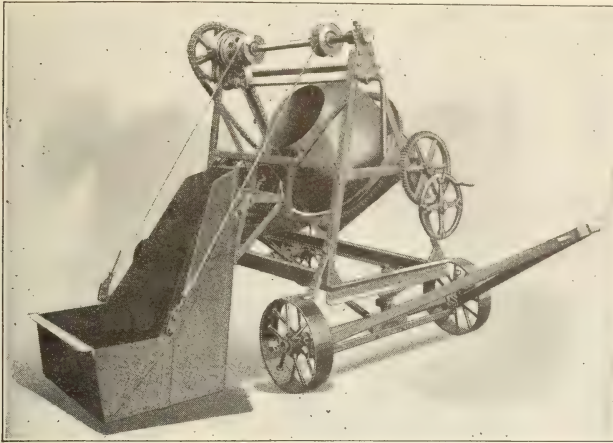
AMERICAN PLAN... \$7.00 and up

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Golf Club Privileges

JOEL HILLMAN, Proprietor



**THE ULTIMATE
COST OF A MIXER
PROVES ITS VALUE
TO A CONTRACTOR.**

The Austin Cube-Hex in its second year has found and made friends everywhere.

We have reduced the price through standardization and quantity production.

Many testimonials as to its economy in operation

are available to you on request. It is sturdy, practical and unfailing in operation and a quick mixing unit. Write for descriptive matter.

Austin Cube Mixers — Drum Mixers — Cube-Hex Pavers — Drum Paver — Tamper and Finisher — Wagon Loader — Asphalt Plants — Clamshells — Shovels — Trench Machines — Backfillers — Draglines — Cranes.

AUSTIN MACHINERY CORPORATION

3500 Dorr Street

Toledo, Ohio

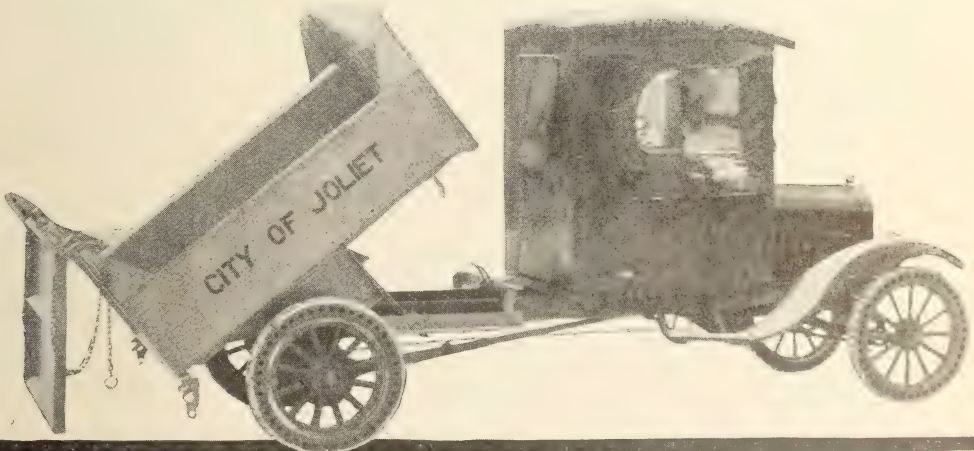
**LEE-4D DUMP BODIES
ARE ECONOMICAL**

This new self-dumping body for collecting garbage, rubbish and refuse provides in one unit an all-round service body for municipal use which enables the truck to be used economically by every city department. Bulletin 77-AC gives worth-while cost data.

LEE TRAILER AND BODY CO.

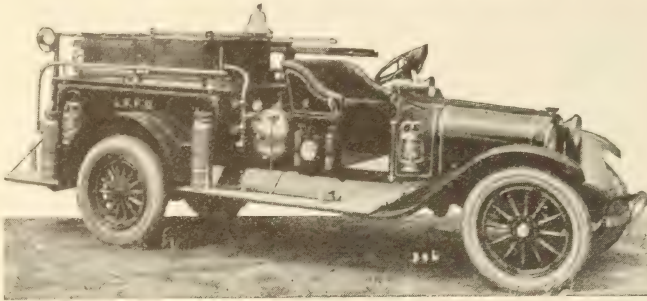
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Chicago, Ill.



MOTOR FIRE APPARATUS

For the Smaller Cities and Towns



*"Childs"
Combination
Chemical and
Hose Car on
Dodge-Graham
Truck Chassis*

HIGH GRADE APPARATUS AT LOW COST

Foamite-Childs Corporation

A Consolidation of Foamite Firefoam Co. and O. J. Childs Co., Inc.

Fire Protection Engineers and Manufacturers

Factory and Executive Offices
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Sales and Engineering representa-
tives in the leading cities

FABRIC FIRE HOSE COMPANY

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FACTORY: SANDY HOOK, CONN.

Patentees and Sole Manufacturers since 1880

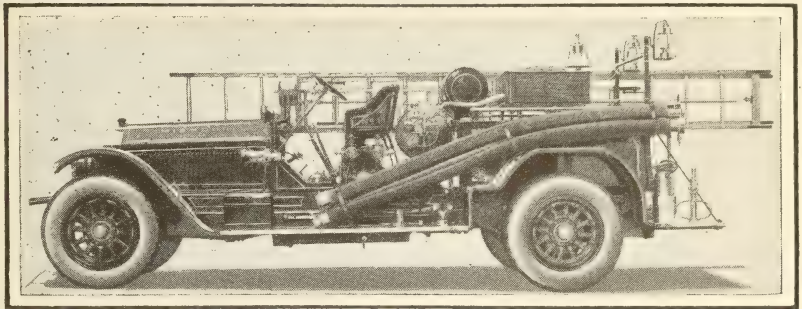
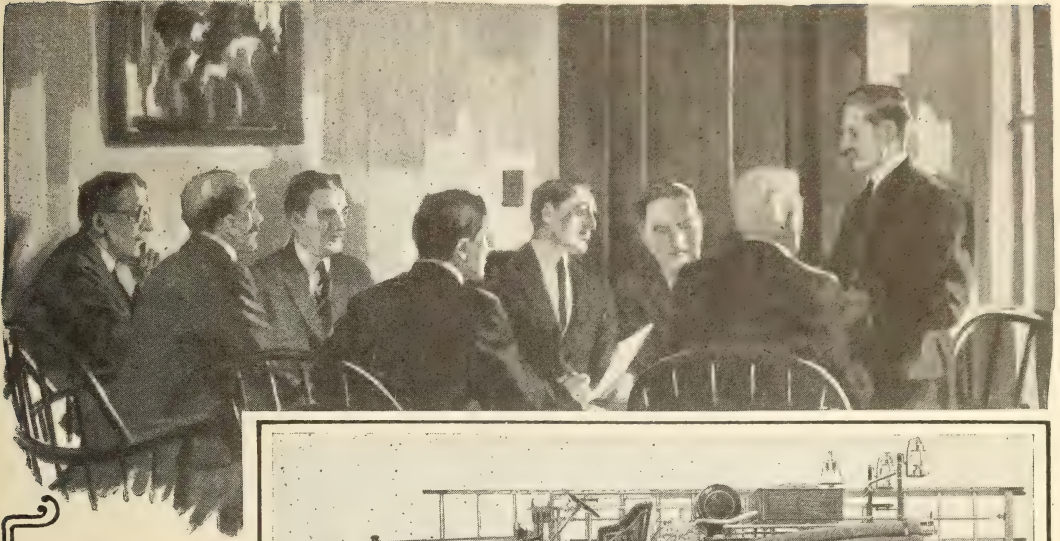
WAX AND PARA GUM TREATED COTTON
RUBBER LINED FIRE HOSE

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Columbus, Ohio
Minneapolis, Minn.

Dallas, Texas
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Pittsburgh, Pa.
Bloomfield, N. J.
Montreal, Canada



AMERICAN-LAFRANCE WINS AGAIN

Exhaustive tests in St. Joseph, Mo. prove superiority of American-LaFrance Fire Apparatus over all competitive makes.

When St. Joseph, Mo. decided to motorize its fire department, a special advisory committee was appointed to investigate all sides of the question. The committee consisted of three members of the Board of Works, the City Engineer, the Chief of the Fire Department, and three other appointed members.

This committee faithfully discharged its task of investigating every make of fire apparatus. It not only conducted thorough tests and examined every design carefully, but also visited many of the factories and inquired as to the experience of cities, using various makes. By process of elimination American-LaFrance was finally selected as possessing the qualities most needed for reliable fire protection.

The result was an order for 13 pieces of American LaFrance Apparatus.

AMERICAN-LAFRANCE MOTOR DRIVEN FIRE APPARATUS IS WORTHY OF ITS REPUTATION AS THE STANDARD OF THE WORLD.

AMERICAN-LAFRANCE FIRE ENGINE COMPANY, INC.

BRANCHES

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BOSTON
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PITTSBURGH
CHICAGO
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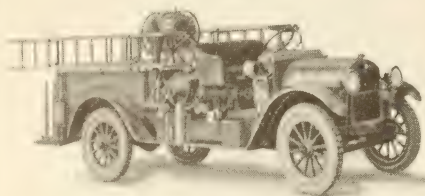
CANADIAN FACTORY
TORONTO, ONT.

BRANCHES

DENVER
MINNEAPOLIS
LOS ANGELES

SAN FRANCISCO
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PORTLAND

Waterous
Dependable



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Complete Equipment
UNDERWRITERS ACCEPTANCE GUARANTEED
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WATEROUS FIRE ENGINE CO.
ST. PAUL, MINN.
Agencies in principal cities

Waterous
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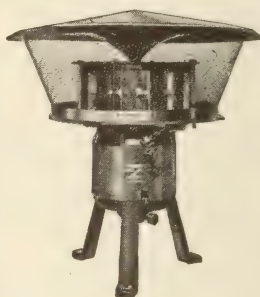
FOR VOLUNTEER FIRE DEPARTMENTS

one of these SIRENS will make every telephone in your town a FIRE CALL box.

Your central can push the button, instantly every fireman no matter where he sleeps or works knows there is a Fire.

YOU WILL FIND THE ERICK SIREN the LOUDEST, NEATEST and BEST MADE. IT IS

S L E E T -
PROOF and
throws the
sound equally
in all directions



**Erick Electric
Siren Co.**

97 S. WABASHA,
ST. PAUL, MINN.



LITTLE GIANT TOURIST DIRECTORS

A well equipped Tourist Camp is a good investment for any community.

Little Giant Tourist Directors at principal highways and junctions within a few hours automobile travel of a Tourist Camp will attract travelers.

LITTLE GIANT GOOD-WILL DIRECTORS

Impress visitors deeply and create local civic pride.

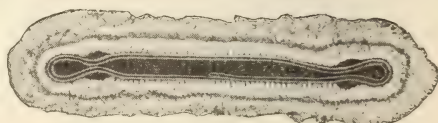
Greet your arriving guests, and bid them God-speed with Little Giant Good-Will Directors.



Little Giant Directors are Striking, Permanent, Dignified, Cheap and Effective Advertising.

They are made of heavy cast semi-steel and are practically indestructible.

LITTLE GIANT CO.
Established 1876
230 Rock St., Mankato,
Minn., U. S. A.

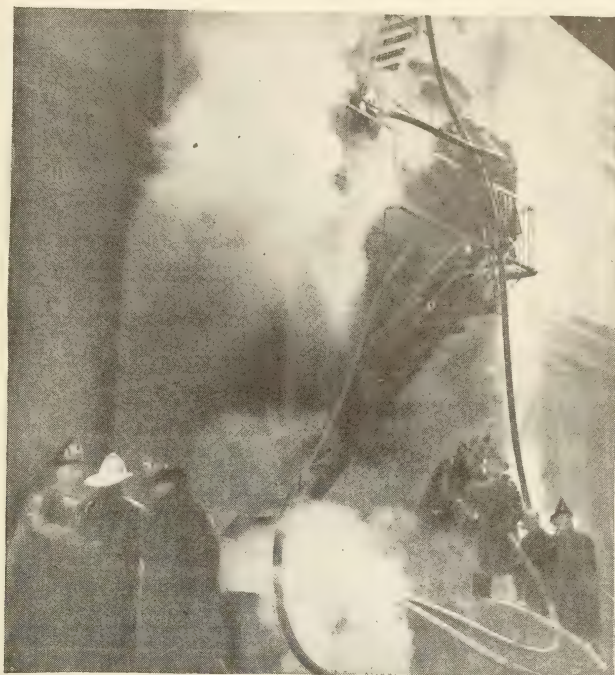


Bi-Lateral Fire Hose construction keeps the rubber from cracking or leaking. If you want the best fire hose at the lowest cost per year of service, send for our catalogue.

Bi-Lateral Fire Hose Co.
9 South Clinton St. Chicago, Ill.

SIRENO
**ELECTRIC
SIRENS**

THE SIRENO COMPANY
STATEN ISLAND
NEW YORK



From Engine to Nozzle!

Out at the nozzle end of the hose lines your men are fighting a game battle against the blaze. A vital factor in their successful protection of life and property is the unfailing performance of every foot of hose from engine to nozzle.

Back your men up with *GOOD* hose such as Paragon or one of the other famous brands of Eureka manufacture that have proved their dependability under every phase of fire service.

United States Rubber Company

EUREKA FIRE HOSE DEPARTMENT

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Mark



Unequalled for Wide or Narrow Streets
Safety Islands Bridge Approaches
Sharp or Narrow Turns
Intersections with or without tracks
Indispensable in Heavy Traffic
Write for Special Offer

TURTLE BACK SILENT TRAFFIC OFFICER

UNION IRON PRODUCTS CO.

EAST CHICAGO
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An efficient, durable
RUBBISH BOX
*FOR STREETS, PARKS
AND
PUBLIC BUILDINGS*

Recommended by Health
Boards and Fire Marshals.

CATALOGUE SENT
ON REQUEST

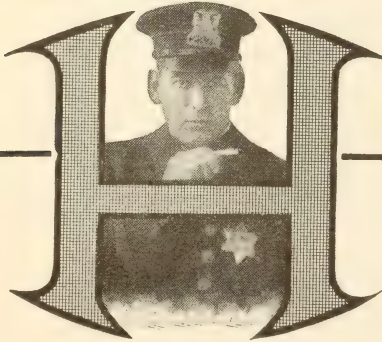
SAFETY SANITARY RUBBISH BOX CO.
500 NORTH 20th STREET, COLUMBUS, OHIO

**BUTLER IMPROVED
STREET CANS**

are sanitary, artistic
and serviceable.
The refuse thrown into
the Butler trash can is
out of sight. Once in, it
stays in until taken out.
Write for latest literature.

The Butler Mfg. Co.
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The Key to Vigilance

HARDINGE SYSTEM
of
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High Efficiency
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HARDINGE BROTHERS, INC.
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Settees result
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prices and longer
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HOLOPHANE CO.
ILLUMINATION SERVICE

A COPY of our book
"Scientific Street
Lighting," now in its second
edition, will be sent you
free on request.

HOLOPHANE GLASS CO., INC.
Dept A. C. 5. 342 Madison Ave., New York
Works: Newark, Ohio.
*In Canada: Holophane Co., Ltd., 146 King St., W.
Toronto*

For safety sake specify Porcelain Enamel

THE Peerless Fire Alarm Box now stands a break down test twice as high as any other box. Three coats of porcelain enamel—one of the best insulators—have been applied to the inside square case and the inside round case. The person using it and the box itself are better protected than ever before.

These boxes have had a service test of a year and a half and thousands are in use today. Specify Peerless Porcelain Steel Boxes on your next order for safety sake. If you have any obsolete boxes in service our nearest agency will be pleased to make a special proposition for taking back the old boxes and installing the modern Peerless Box in their place.

THE GAMEWELL COMPANY

Newton Upper Falls, Mass.

A BOX A BLOCK



MUNICIPALITIES

contemplating extensive improvements of any kind, will appreciate the value of durable and everlasting traffic regulation and street signs. "READY MADE" Porcelain Enamelled Iron Signs are carried in stock or made to order. They are guaranteed non-fading and non-rusting, they stand the wear of climatic conditions without damage, always look well and give 100% efficient service. They are the best for street signs, traffic regulation signs, house number plates, milk carts and other license plates and sign purposes of any kind.

Ask for Catalogue.

Send us specifications for prices.

No obligation incurred.

READY MADE SIGN COMPANY
16 West 36th Street, New York

A Western Sign

For Every Purpose

Two-Way
or
Four-Way
Reading

Street
Signs



Interchangeable
Panels

Adjustable Spacers
for Reading
at Any Angle

WRITE FOR LITERATURE

WILL

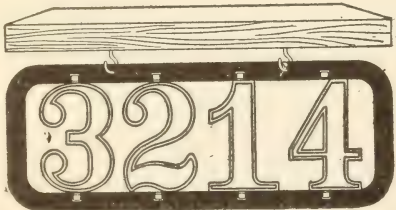
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RUST

Manufactured by

Western Display & Mfg. Co.

Saint Paul, -:- Minnesota



CLIMAX HOUSE NUMBERS

A new principle in house numbering. Can be seen at all times.

Figures are pure aluminum 3 inches high and set in a black Japanned frame.

We can help you renumber your city.

Write for circular.

The Hamilton Metal Products Co.
Hamilton, Ohio.



DE LUXE HOUSE NUMBERS PREMAX HOUSE NUMBERS

Made in a wide variety of sizes and finishes

Niagara Metal Stamping Corp.

Niagara Falls, N. Y.



SYSTEM SIGNS SAFETY FIRST

ought to be the Slogan of every City

We are the Pioneers of

SYSTEM

Street, Road and Traffic
SIGNS

Hundreds of Cities use our

SYSTEM SIGNS

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SIGNS

in one City

Write for literature.

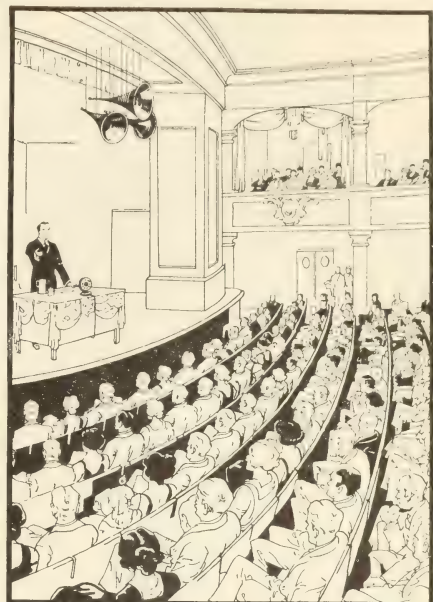
**MUNICIPAL PRODUCTS &
ELECTRIC CO., INC.**

formerly Thompson-Fleming Co.

Main Office

883 Ellicott Square, Buffalo, N. Y.

Factory 176 Ellicott Street



Pantomimist or Speaker

Contrast the two sections of this picture.

An audience's attention drifts away from a speaker when it fails to hear him.

Amplify his voice so it can be heard clearly, distinctly and comfortably in all parts of a hall and he becomes of interest. He is heard and heeded.

Western Electric

Public Address Systems

provide such amplification and distribution. A conversational tone can be heard comfortably by an audience limited only by the size of the auditorium, when such a system is used.

These systems can be applied wherever the spoken word must be distributed quickly and heard clearly. They fit into the needs of the City Police, Fire and Educational Departments.

Ask for Bulletin 672-C. Address this Company at
195 Broadway, New York, New York.

Since
1869
Makers of
Electrical
Equipment

Western Electric Company

110 William Street

New York City

There's economy in Canco Quality



WHEN a town buys it must buy well and wisely. Quality as well as price must be considered. The desideratum is value—measured in this case by cost price divided by length of life.

Canco street cleaning cans, like all Canco galvanized ware, present a good appearance that endures through hard use. Their service records show they are as good as they look. Let us refer you to cities that have standardized on Canco products.

A letter to our factory at Toledo, Ohio, will bring prompt information.

American Can Company



1828 MOTT 1923

MEMORIAL FOUNTAINS

with Bronze Tablets
for Heroes who served
in the World War.

*Lamp Posts and
Electroliers*

*Lawn and Park
Ornaments*

*Ornamental
Iron Work*

of every description.
Our Designers are at
your service for special
designs and sketches.



THE J. L. MOTT IRON WORKS

*Fifth Ave. and Seventeenth Street
NEW YORK*



AN OUT-DOOR FOUNTAIN

Should be built **SOLELY**
for that purpose.

The MURDOCK
(PATENTED)

**ANTI - FREEZING
BUBBLE - FONT**

IS BEST FOR

*Parks, Playgrounds, Public
and All Open Streets Places*

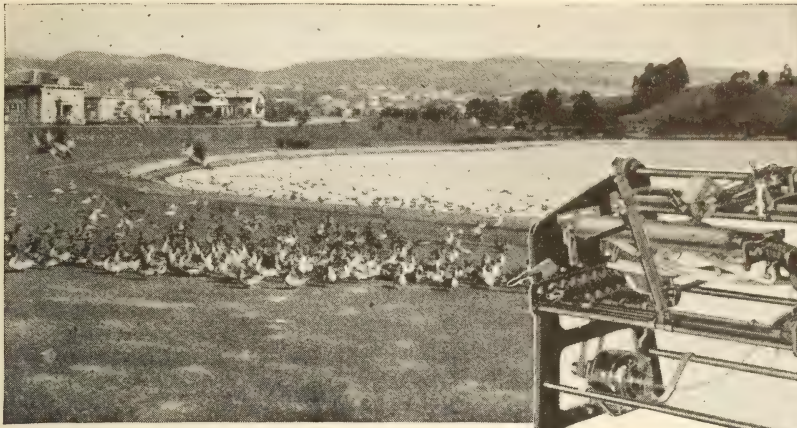
It was designed and is built Solely
for outdoor use. It does not have
to be turned off at the approach
of cold weather.

Write for fully illustrated literature to

**The MURDOCK MFG. & SUPPLY
COMPANY**

**FIRE HYDRANTS
YARD HYDRANTS
HOSE BOXES**

CINCINNATI - - - - OHIO
Builders of Water Service devices since 1853



Oakland City Park, Oakland, Calif. The Peerless Lawn Mower Grinder sharpens all of the mowers.

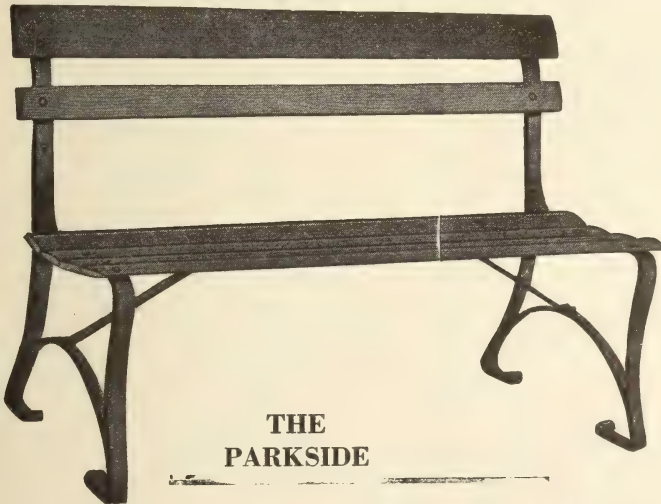
Save Money by Using the Peerless Lawn Mower Grinder

The Peerless Lawn Mower Grinder sharpens all makes of Power, Horse and Hand Mowers in 20 to 30 minutes, keen as a razor, with any desired clearance or bevel. Mowers run easier, less power required, hence more speed. One owner reports they have dispensed with one man. Another writes: "The Peerless Grinder saves us \$700 to \$800 annually."

Write for catalog and list of users. Will save its cost several times over the first season.

THE FATE-ROOT-HEATH CO.

PLYMOUTH, OHIO



THE
PARKSIDE

**Our Line of Park
Benches Is Com-
plete.**

**Our Prices
Are Right**

**If You Will In-
stall the Best—
Drop Us a Line.**

BUY BAUSMAN BETTER BENCHES

BAUSMAN MFG. CO.

BAUSMAN, PA.

BENCH MAKERS FOR TWENTY-FIVE YEARS

The High Cost of Flashing Signals

DRESSSEL FLASHER 1923

Heavy
Steel

Forceful
Flash

R. R.
Type

40 Flashes
Per Min.

Electric
Operation

High
Visibility



Use Either
"Keep
Right" or
Direction
Signs

"Keep
Right" Sign
Not
Furnished
with Dressel
Flasher 1923

The Dressel Flasher is a Steel Lamp, big and husky—white baked japan finish. Gloss black, green or signal yellow will be furnished when specified.

It has four 25-power high-transmission 53/8" RED Spreadlight Lenses. Green or Amber Lenses will be supplied if ordered.

The Flashing Mechanism is arranged for one 40-Watt electric bulb, but, if dual lighting is desired, two sockets for two 25-W bulbs will be furnished.

Bottom of lamp fits 2" Pipe

PRICE \$30.00 Each

Order of 12 or more \$27.00 Each

F. O. B. Arlington, N. J.

INSTALL 4 OR MORE FLASHING SIGNALS
FOR WHAT YOU THOUGHT YOU WOULD
PAY FOR ONE

Think of that

We will furnish the complete flashing signal consisting of Lyle Silent Policeman and Dressel Flasher "1923."

Price \$49.00 includes cast iron base.
F. O. B. Factory

Eastern Distributors

Mushroom Traffic Lights.....Page 67
Lyle Signs.....Page 123

Dressel, Main Company, Inc.
TRAFFIC ENGINEERS
Grand Central Terminal, New York City

A week—or more—in Yellowstone Park

"Go In Gardiner, Out Cody"

Another week, or more, in Colorado! Can you imagine a more wonderful vacation.

The motor-trip through Yellowstone Park can be made in 4½ days, but you should stay longer. Some people remain a month. Nowhere else, they say, can they pass time so happily. The cool, pine-laden air, the fishing, the extraordinarily varied scenery, the delightful social life—these are attractions which draw tens of thousands annually. The standard Park tour costs \$54 if you stay at the hotels; \$45, at the camps.

And Colorado—only twenty-six hours distant—is as satisfying, in its way, as Yellowstone Park. Rocky Mountain (Estes) Park—a summer paradise—is only a few hours distant from Denver. So is Colorado Springs, nestling at the foot of Pike's Peak. The round trip to and thro' the "Royal Gorge" can be made in a day from Denver or Colorado Springs.



A Yellowstone Park "Camp"

Low Summer Rates

of the Northern Pacific make it possible for thousands to visit Yellowstone Park, who otherwise might feel that the trip is too expensive.

I want to send you our Yellowstone Park book and tell you about a real Vacation.

Northern Pacific train service—there's nothing better ANYWHERE.

A. B. Smith, Pass. Traffic Manager
973 Northern Pacific Bldg., St. Paul, Minn.

Northern Pacific Ry.

"2000 Miles of Startling Beauty"

68A

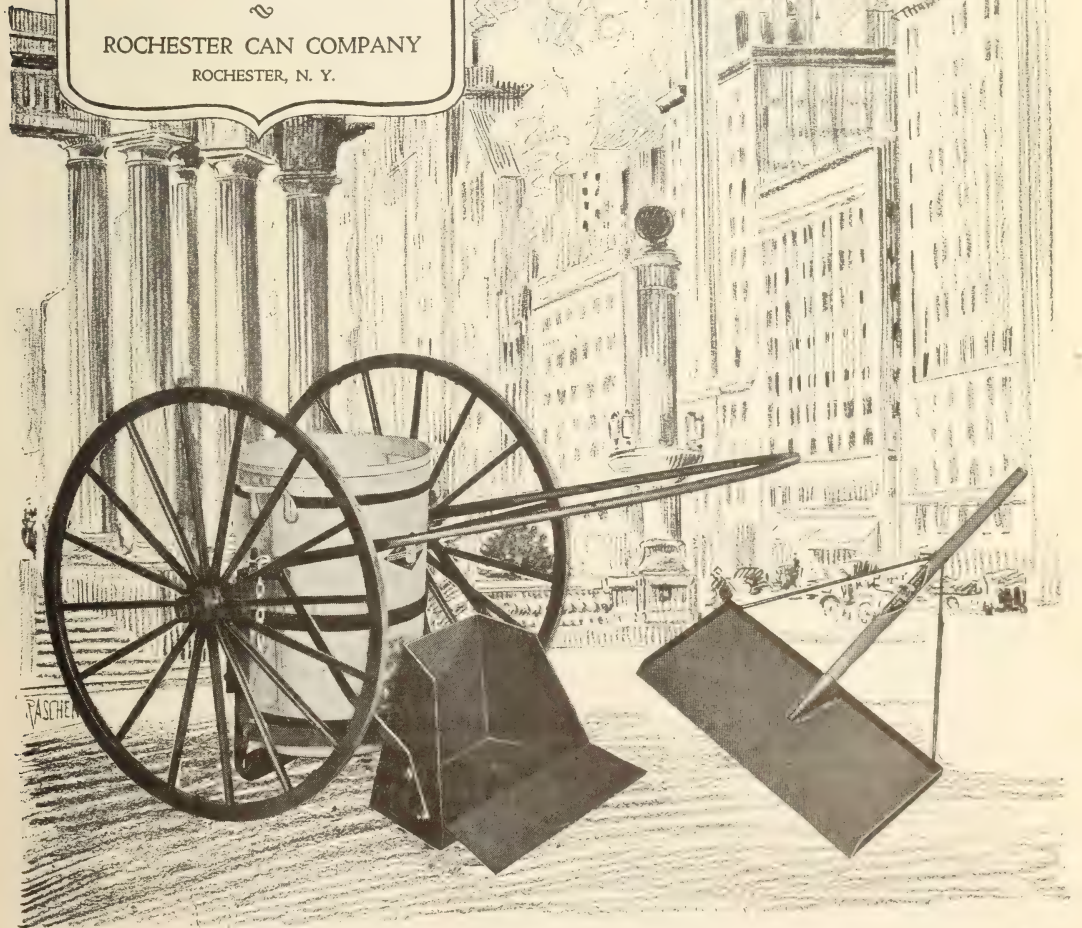
Keeping City Streets Clean

IRON HORSE Street Cleaners and Scrapers are familiar sights on the streets of a large number of progressive cities all over the country. And scores of other municipalities are adopting *Iron Horse* Street Cleaning Equipment and Metalware yearly, as they have come to rely on its wear-resisting quality and the fact that it continues to give faultless service long after ordinary equipment has been relegated to the scrap heap.

You will be interested in our complete *Iron Horse* Metalware Catalog No. 921, showing our complete line, beautifully illustrated in color. Write for your copy today.

ROCHESTER CAN COMPANY

ROCHESTER, N. Y.

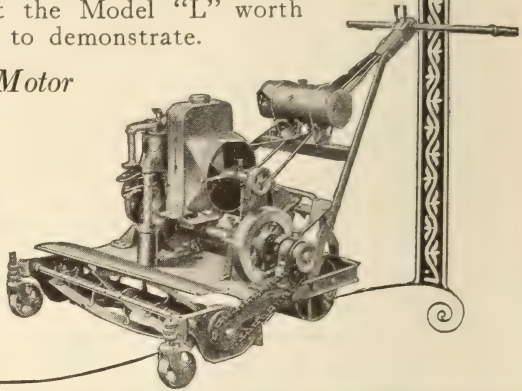


A Gallon of Gas— Six Acres per Day—

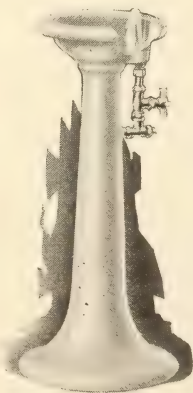
Valuable facts for economical lawn maintenance that have been demonstrated in city parks the country wide. The Model "L," besides being kind to the purse, is kind to the lawn—each acre that it cuts and rolls becomes a vigorous patch of velvety green—it's the close trim, and the regular trim, that makes for healthy turf. There are lots more points about the Model "L" worth noting. We would be glad to demonstrate.

*"Hand, Horse, Golf and Motor
Mowers"*

COLDWELL
Lawn Mower Co.
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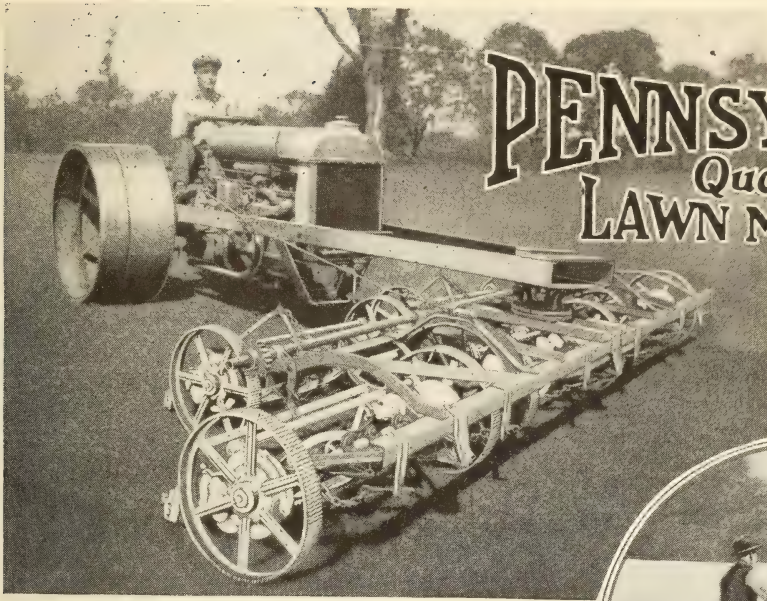


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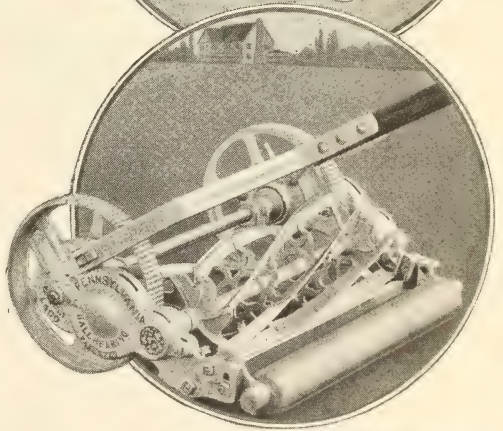
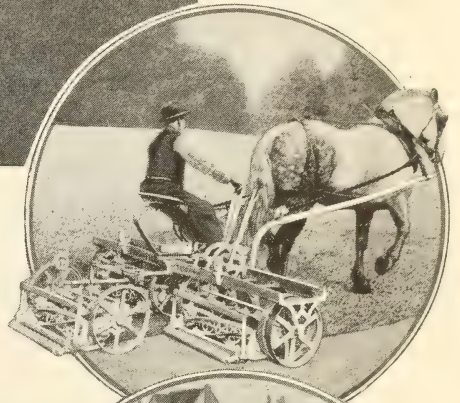
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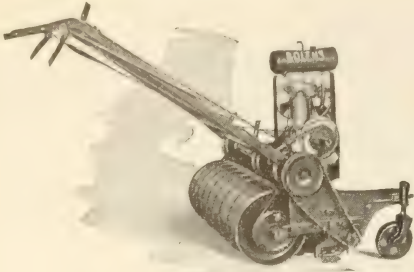


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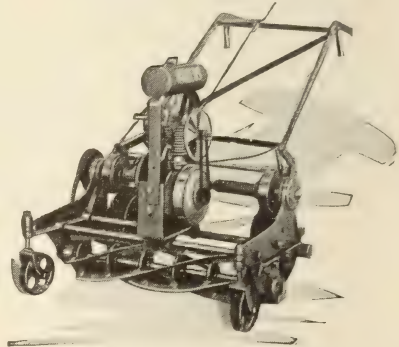
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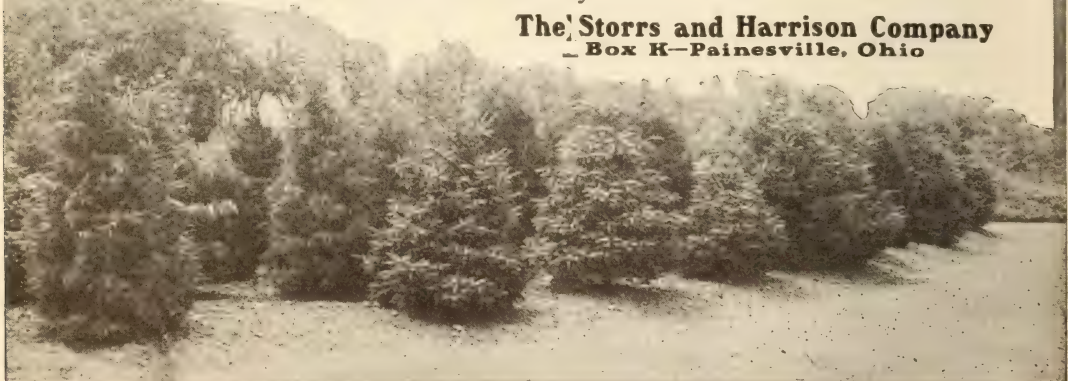
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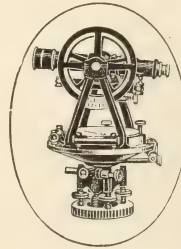
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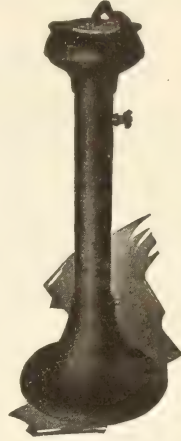
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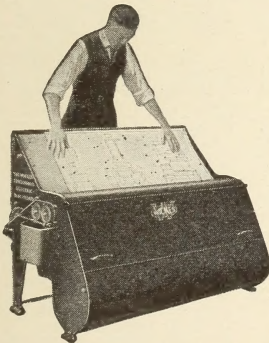
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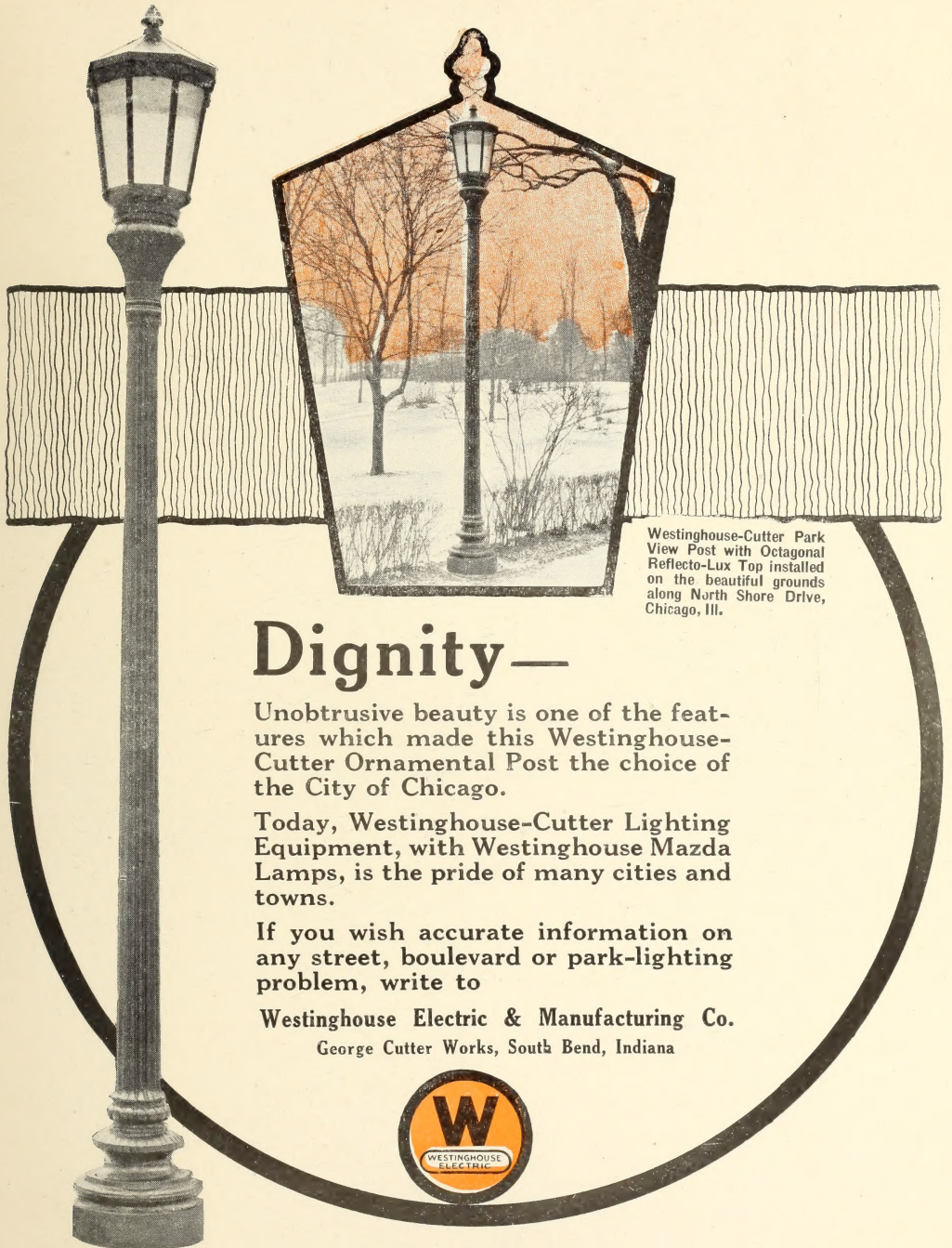
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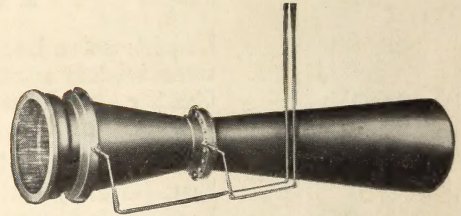
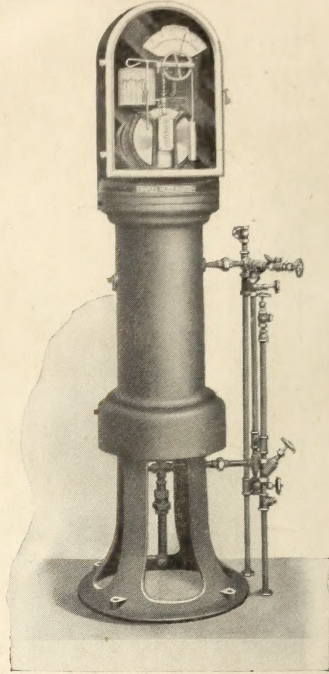
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